

U.S. ENGINEERS - LAKE SUBVYS

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A meeting was held in Bloomington, Indiana, on Friday, September 15, 1961, to review the road system that will be needed for access to Monroe Reservoir. The county surveyors and county commissioners of Brown, Jackson, Lawrence, and Monroe Counties attended the meeting, during which they outlined the routes they agree will be absolutely essential in their respective counties in order to tie into the existing state and federal highway systems as well as to promote and maintain reasonable routes for local traffic.

By using as a guide the maps prepared by the Indiana Flood Control and Water Resources Commission entitled "Monroe Reservoir, Public Lands and Federal Aid Roads" (dated November 1960) and "Monroe Reservoir Access Roads" (dated August 1960) and the appropriate topographic sheets prepared by the U. S. Geological Survey, the group outlined the following routes as those they believe absolutely essential to best serve the area, its residents, and its visitors. The routes listed will in part be needed to replace existing routes that will be disrupted by construction of Monroe Reservoir. They have been extended to a point where they tie into existing State or U. S. Highways. The entire route of each will need widening and major reconstruction, however, if it is to carry the volume of traffic the group anticipates will move through the Monroe Reservoir area.

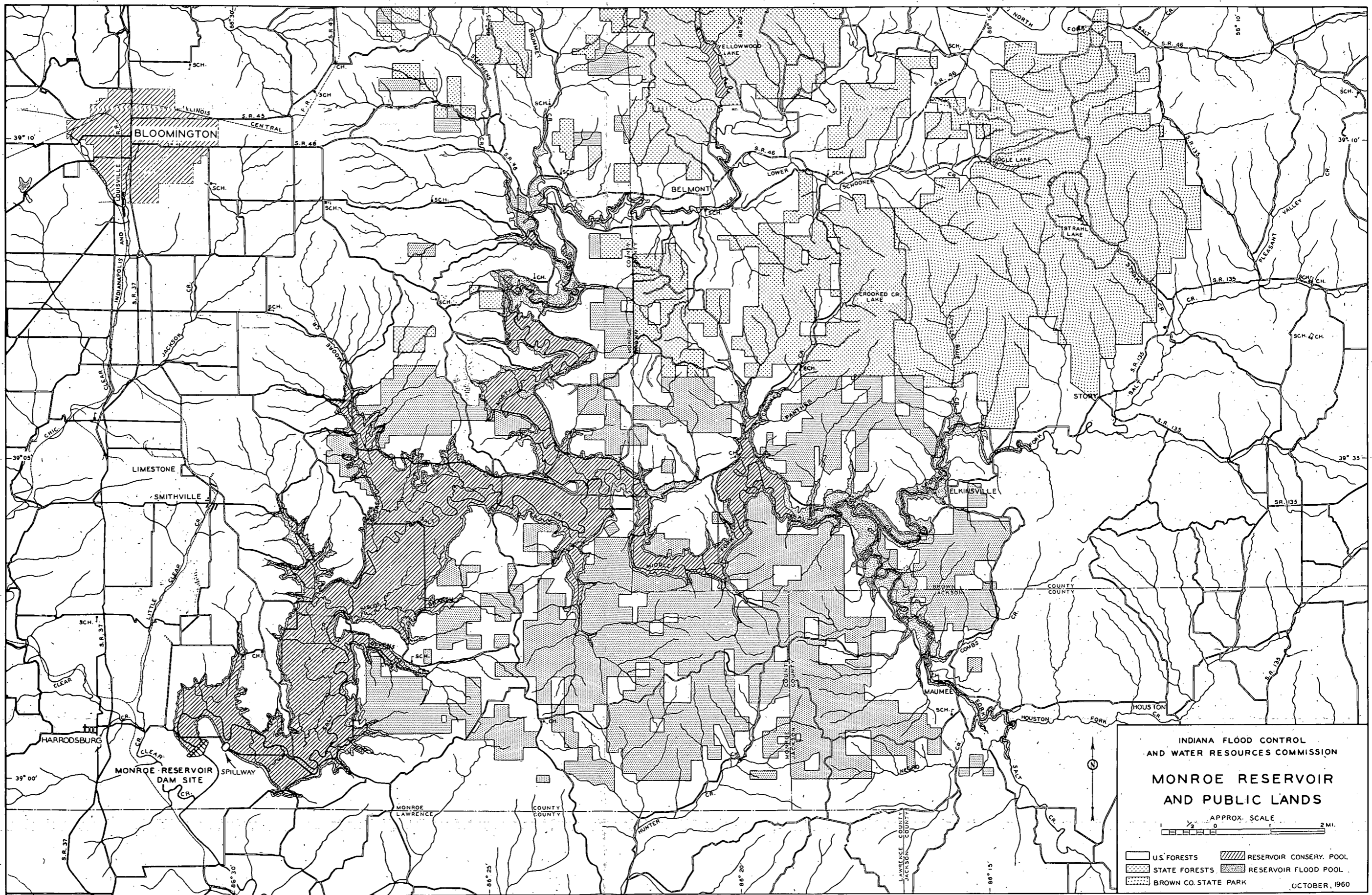
A route will be essential to move traffic, both tourist and local, through the central part of the lake area from both north and south without creating any additional congestion on Indiana Highway 37 and the roads that lead eastward from it into the reservoir area. To move this traffic most conveniently, Road S-670 south of Indiana Highway 46 should connect with Road S-988 to go across a causeway (shown as "proposed" on some maps) near the center of the reservoir. The route should continue southward, from the causeway about 3 miles, thence southwestward on the road through Chapel Hill,

thence continuing into Road S-983 in Lawrence County via either the road southwest from Chapel Hill, by Road S-202 to Bartlettsville, or both.

A good route going southeastward from the reservoir must be built and maintained in order to adequately handle traffic headed to the lake that arrives in Seymour and Brownstown via U. S. Highway 31 and Interstate 65 from Louisville and other cities southeast of the lake. The route for this road that is favored by and most strongly recommended by the commissioners of the counties involved is one that would follow or closely parallel Road S-976 through Maumee northwestward to a proposed causeway near the eastern end of the lake. From this causeway the route would follow Road S-671 northward to Belmont.

A further justification offered for the need for this route by local residents is the considerable commuting that takes place between Jackson County and Indiana University. Without a direct road northwestward, these persons would find it necessary to follow a much longer detour to reach their places of work and study.

The commissioners and surveyors of all counties represented in this meeting pointed out that they will be unable within their counties to raise sufficient funds either to build these needed roads or to meet Federal Aid matching funds. Construction, therefore, will have to be done by as part of the reservoir project or by state or federal highway authorities.



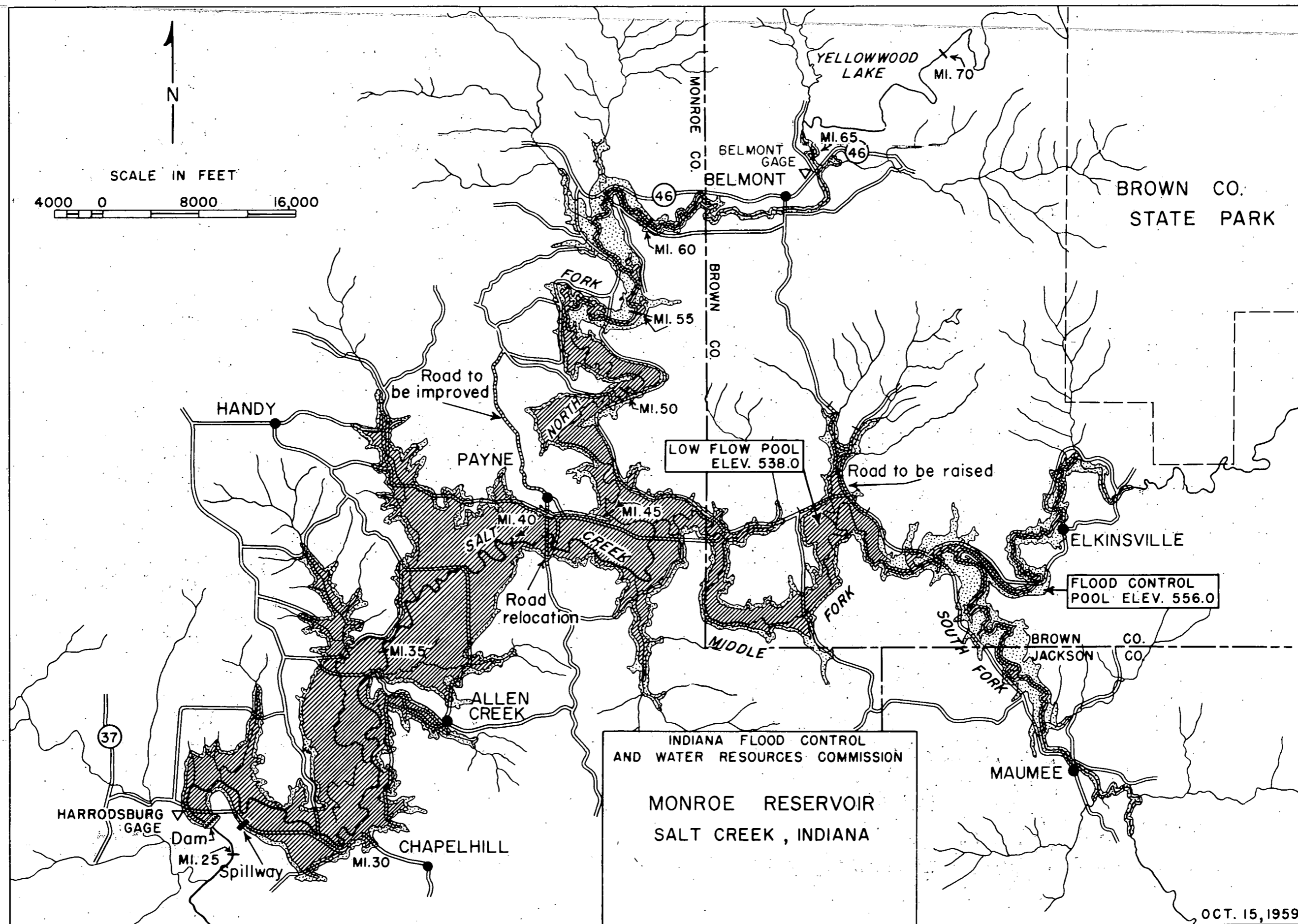
INDIANA FLOOD CONTROL  
AND WATER RESOURCES COMMISSION

**MONROE RESERVOIR  
AND PUBLIC LANDS**

APPROX. SCALE  
0 1 2 MI.

U.S. FORESTS    RESERVOIR CONSERV. POOL  
STATE FORESTS    RESERVOIR FLOOD POOL  
BROWN CO. STATE PARK

OCTOBER, 1960



# INTER-DEPT. MEMORANDUM

## MONROE COUNTY HIGHWAY

From: -----

Date: -----

To: -----

Subject: -----

17 to 17' - N 36-46 W 233.4

17 to 18' - N 36-46 W 34.9

18 to 18' - N 20-31 E = 137.7

18 to 19 - N 20-31 E = 4.7

19 to 19' - N 47-51 W - 181.8 = 909

19 to 20 = N 47-51 W - 126

20 to 20' = N 44-05 E - 141.5

20 to 21 = N 44-05 E - 83.9

21 to 21' = N 34-53 W - 162.8

21 to 22 = N 34-53 W - 84.8

22 to 23 = N 39-16 E - 215.9

23 to 24 = S 88-04 W - 256.0

24 to 25 = S 14-39 W - 174.5

25 to 26 = S 86-50 W - 136.9

26 to 26' = N 40-27 W - 110.00

26 to 27 = N 40-27 W - 174.4

27 to 28 = N 07-51 E - 119.3

28 to 29 = N 33-21 E - 174.3

16 to 17 = N 4-15 W - 314.4

15 to 16 = N 14-52 E - 572.8

By: -----

$$\begin{array}{r} 2 \overline{) 198} \\ \underline{4} \\ 18 \\ \underline{36} \\ 18 \end{array}$$

$$\begin{array}{r} 280 \\ 2 \overline{) 572.8} \\ \underline{4} \\ 172 \\ \underline{34} \\ 136 \\ \underline{68} \\ 68.8 \end{array}$$

$$\begin{array}{r} 286 \\ 286 \\ \underline{72} \\ 214 \end{array}$$

$$\begin{array}{r} 116.7 \\ 1 \overline{) 233.4} \\ \underline{116.7} \\ 116.7 \end{array}$$

$$\begin{array}{r} 157 \\ 2 \overline{) 314} \\ \underline{157} \\ 157 \end{array}$$

$$\begin{array}{r} 15 \\ 48 \\ \underline{27} \\ 21 \end{array}$$

$$\frac{134}{2} = 67$$

$$\begin{array}{r} 6285 \\ 2 \overline{) 12570} \\ \underline{12570} \\ 0 \end{array}$$

$$\frac{14}{2} = 7$$

$$\begin{array}{r} 92 \\ 2 \overline{) 184} \\ \underline{184} \\ 0 \end{array}$$

$$\frac{74}{2} = 37$$

$$\begin{array}{r} 216 \\ 108 \\ \underline{108} \\ 0 \end{array}$$

$$\begin{array}{r} 128 \\ 2 \overline{) 256} \\ \underline{256} \\ 0 \end{array}$$

$$\frac{13.5}{2} = 6.75$$

Monroe

James Simpson

MONROE RESERVOIR  
MAPS

5185

James A. Lewis  
Box 5779  
Lansville Ky.  
Attn: Englewood

138.8  
629  
1577

OHIO RIVER BASIN

# MONROE RESERVOIR, INDIANA

RELOCATION OF STATE AND COUNTY ROADS

SHEETS 1, 3, 4



U.S. ARMY ENGINEER DISTRICT, LOUISVILLE  
CORPS OF ENGINEERS  
LOUISVILLE, KENTUCKY

ALL DRAWINGS IN THIS FOLIO  
HAVE BEEN REDUCED ONE  
HALF THE ORIGINAL SIZE

# MONROE RESERVOIR, INDIANA

## RELOCATION OF STATE AND COUNTY ROADS

### SITES 1, 3 AND 4

EFW 143-12.4/1 INDEX SHEET  
EFW 143-12.4/2 GENERAL PLAN

#### SITE 1 RELOCATION OF IND. ROUTE 46

EFW 143-12.4/3 PLAN & PROFILE - SHEET 1  
EFW 143-12.4/4 CROSS SECTIONS - SHEET 1  
EFW 143-12.4/5 CROSS SECTIONS - SHEET 2  
EFW 143-12.4/6 CROSS SECTIONS - SHEET 3  
EFW 143-12.4/7 CROSS SECTIONS - SHEET 4

#### SITE 3-RELOCATION OF MONROE CO. RD. — AT RAMP CREEK

EFW 143-12.4/8 PLAN & PROFILE - SHEET 1  
EFW 143-12.4/9 CROSS SECTIONS - SHEET 1  
EFW 143-12.4/10 CROSS SECTIONS - SHEET 2  
EFW 143-12.4/11 CROSS SECTIONS - SHEET 3  
EFW 143-12.4/12 CROSS SECTIONS - SHEET 4  
EFW 143-12.4/13 CROSS SECTIONS - SHEET 5  
EFW 143-12.4/14 CROSS SECTIONS - SHEET 6  
EFW 143-12.4/15 CROSS SECTIONS - SHEET 7

#### SITE 4- RELOCATION OF MONROE CO. RD. — AT SUGAR CREEK

EFW 143-12.4/16 PLAN & PROFILE - SHEET 1  
EFW 143-12.4/17 CROSS SECTIONS - SHEET 1  
EFW 143-12.4/18 CROSS SECTIONS - SHEET 2  
EFW 143-12.4/19 CROSS SECTIONS - SHEET 3  
EFW 143-12.4/20 CROSS SECTIONS - SHEET 4

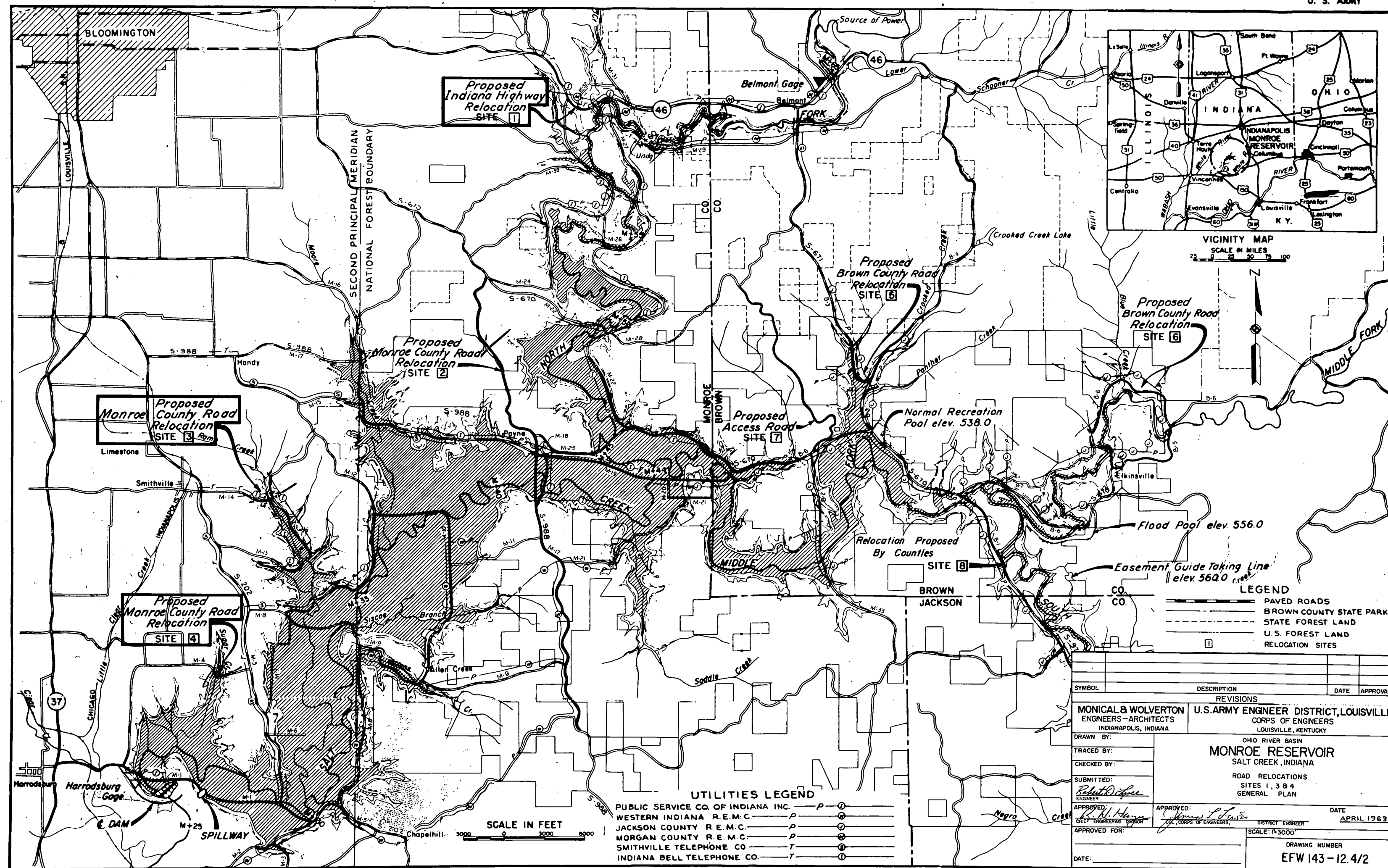
#### SOIL INVESTIGATION - SITES 1, 3 AND 4

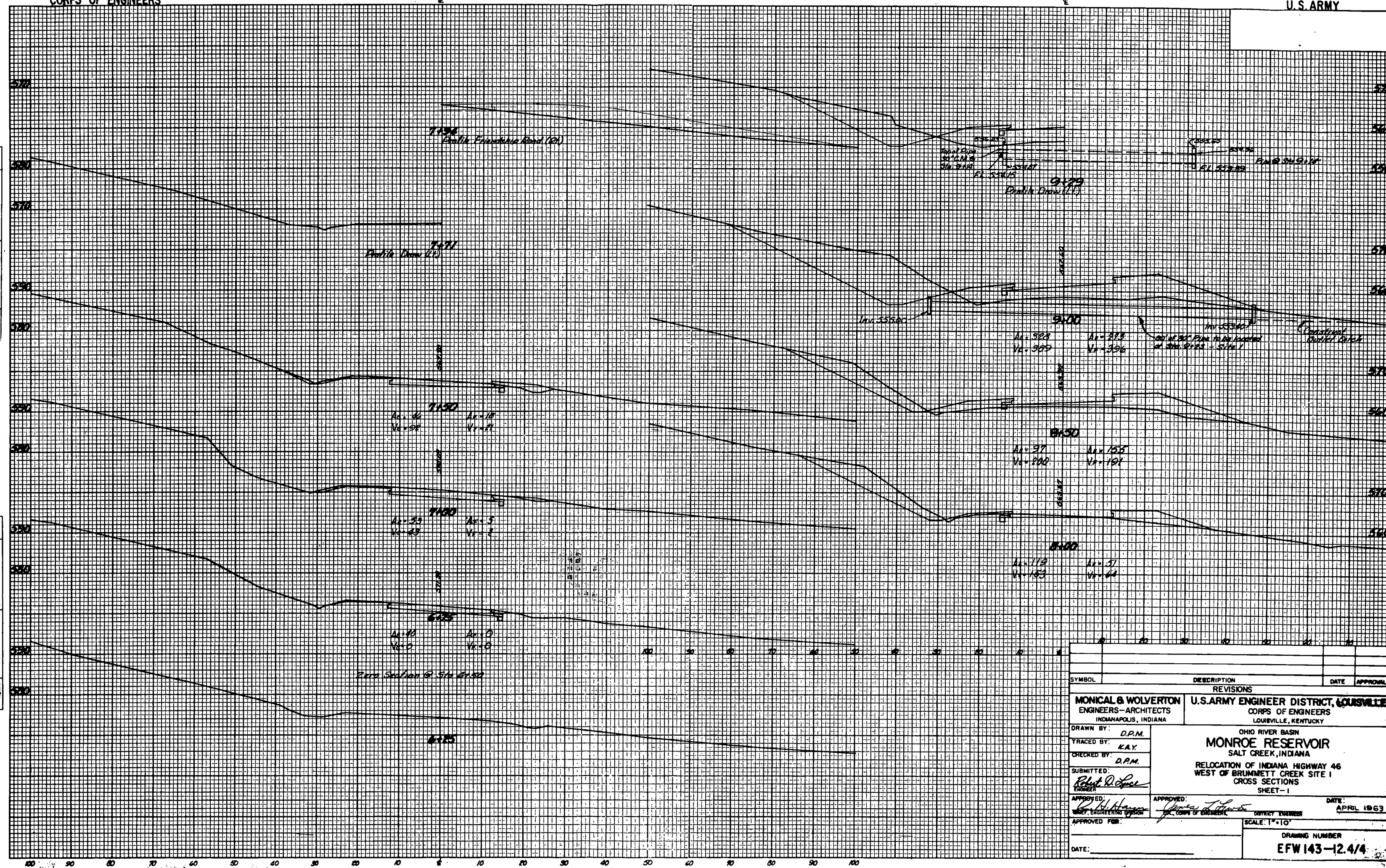
EFW 143-12.4/21 SOIL CLASSIFICATION - SHEET 1  
EFW 143-12.4/22 BORING LOGS & PROTINGS - SHEET 2

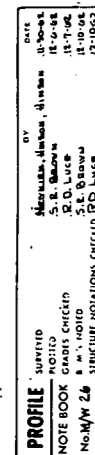
#### ROADWAY DETAILS

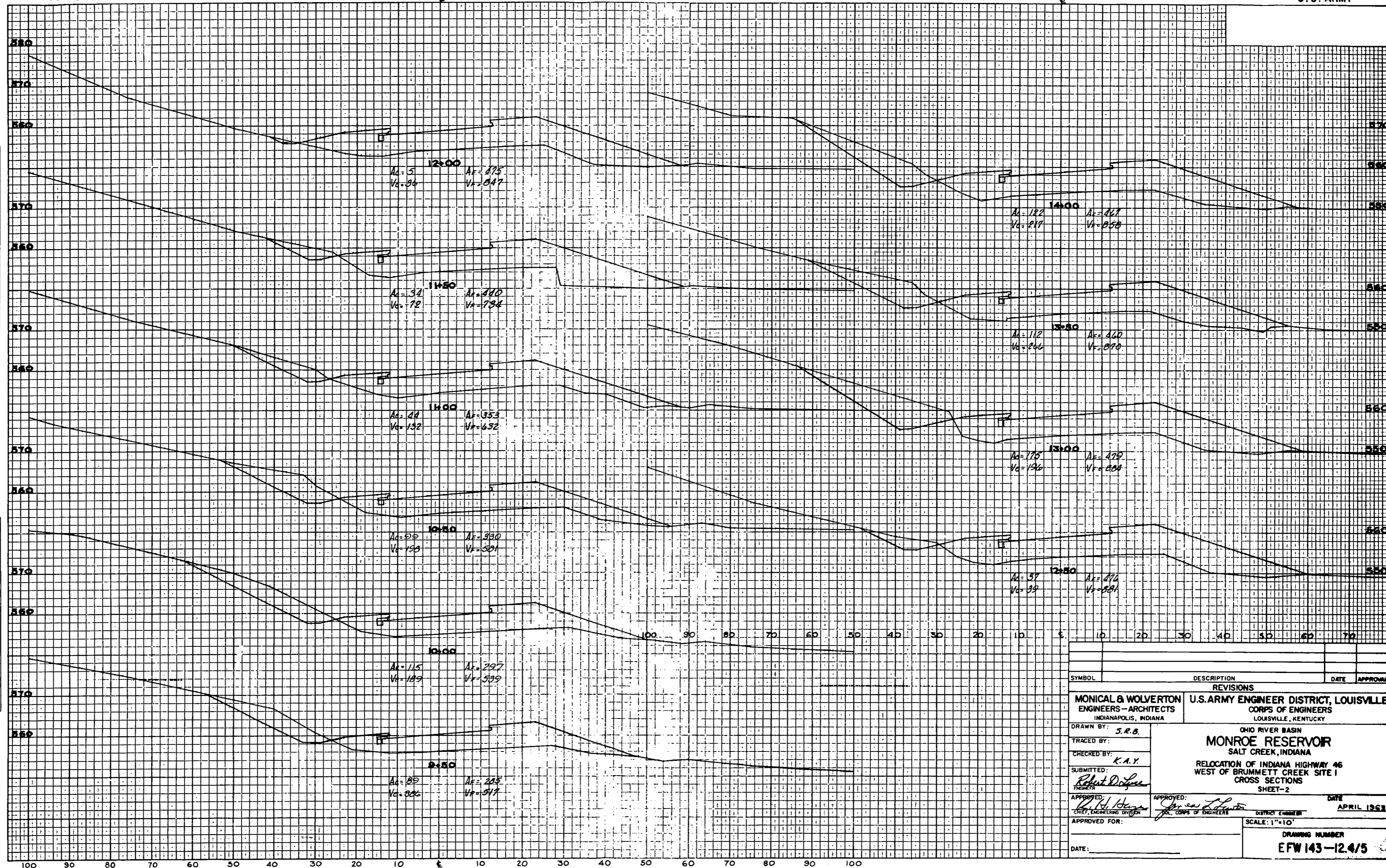
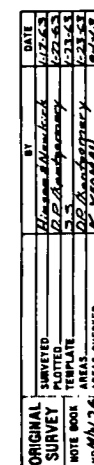
EFW 143-12.4/23 MISCELLANEOUS DETAILS - SHEET 1  
EFW 143-12.4/24 MISCELLANEOUS DETAILS - SHEET 2  
EFW 143-12.4/25 BOX CULVERT DETAILS - SHEET 3

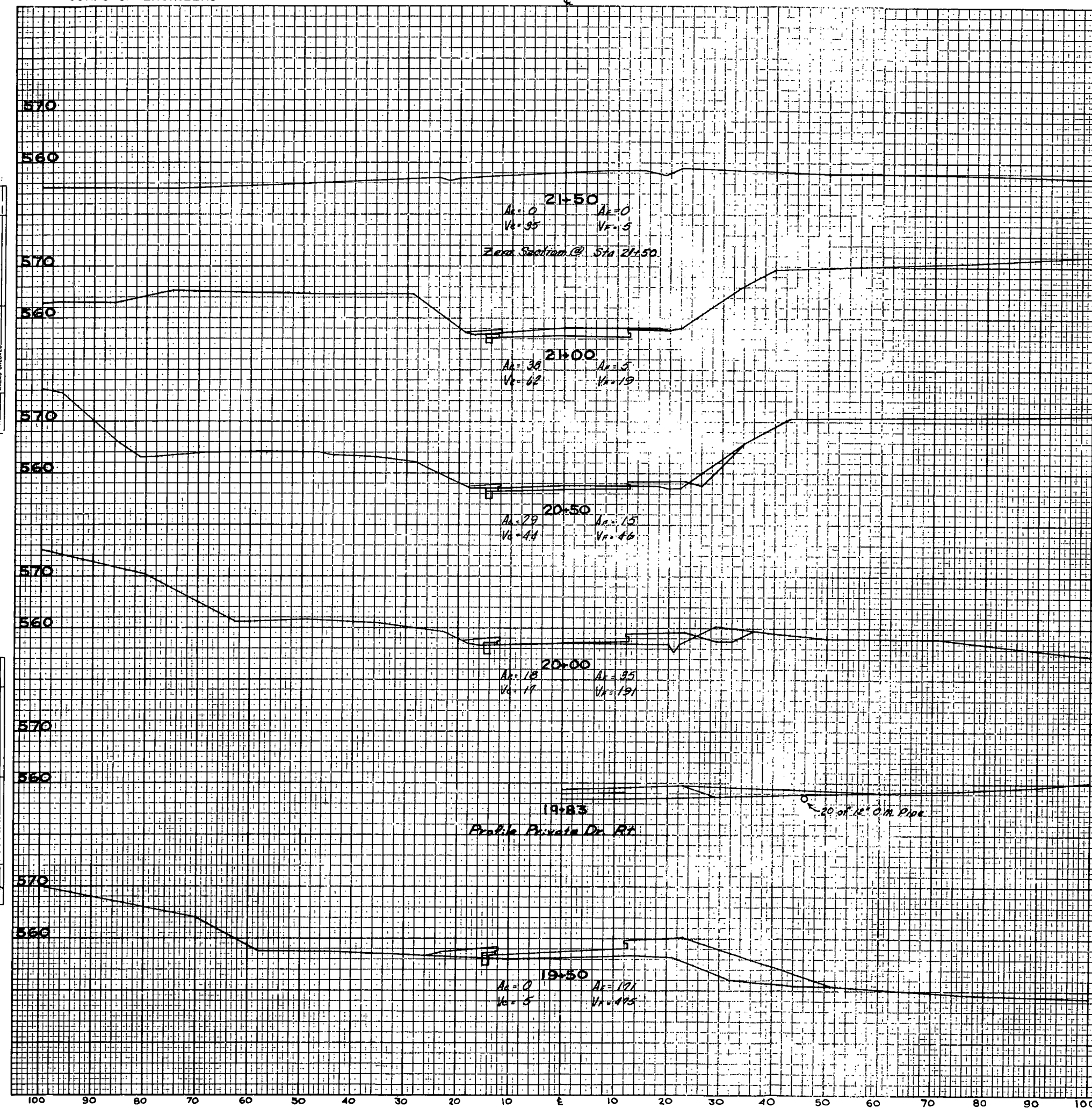
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REVISIONS			
MONICAL & WOLVERTON ENGINEERS-ARCHITECTS INDIANAPOLIS, INDIANA		U.S. ARMY ENGINEER DISTRICT, LOUISVILLE CORPS OF ENGINEERS LOUISVILLE, KENTUCKY	
DRAWN BY: D.P.A.		OHIO RIVER BASIN	
TRACED BY:		MONROE RESERVOIR SALT CREEK, INDIANA	
CHECKED BY:		INDEX SHEET	
SUBMITTED: <i>Robert D. Loe</i> ENGINEER		APPROVED: <i>W. H. Hays</i> CHIEF, ENGINEERING DIVISION	
APPROVED FOR:		APPROVED: <i>W. H. Hays</i> 7 COL, CORPS OF ENGINEERS, DISTRICT ENGINEER	
DATE:		DATE: APRIL 1963	
		SCALE:	
		DRAWING NUMBER EFW 143-12.4/1	





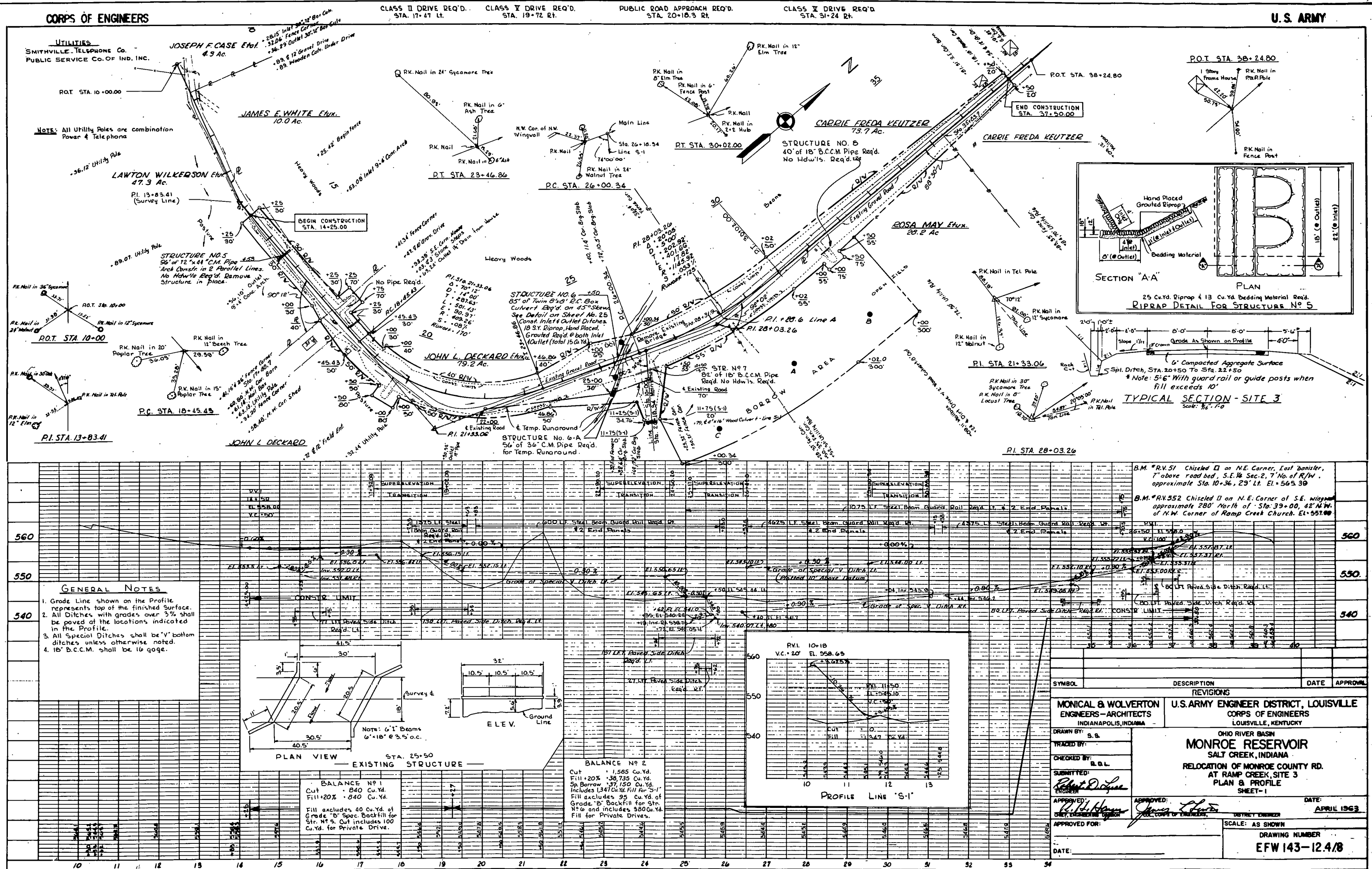
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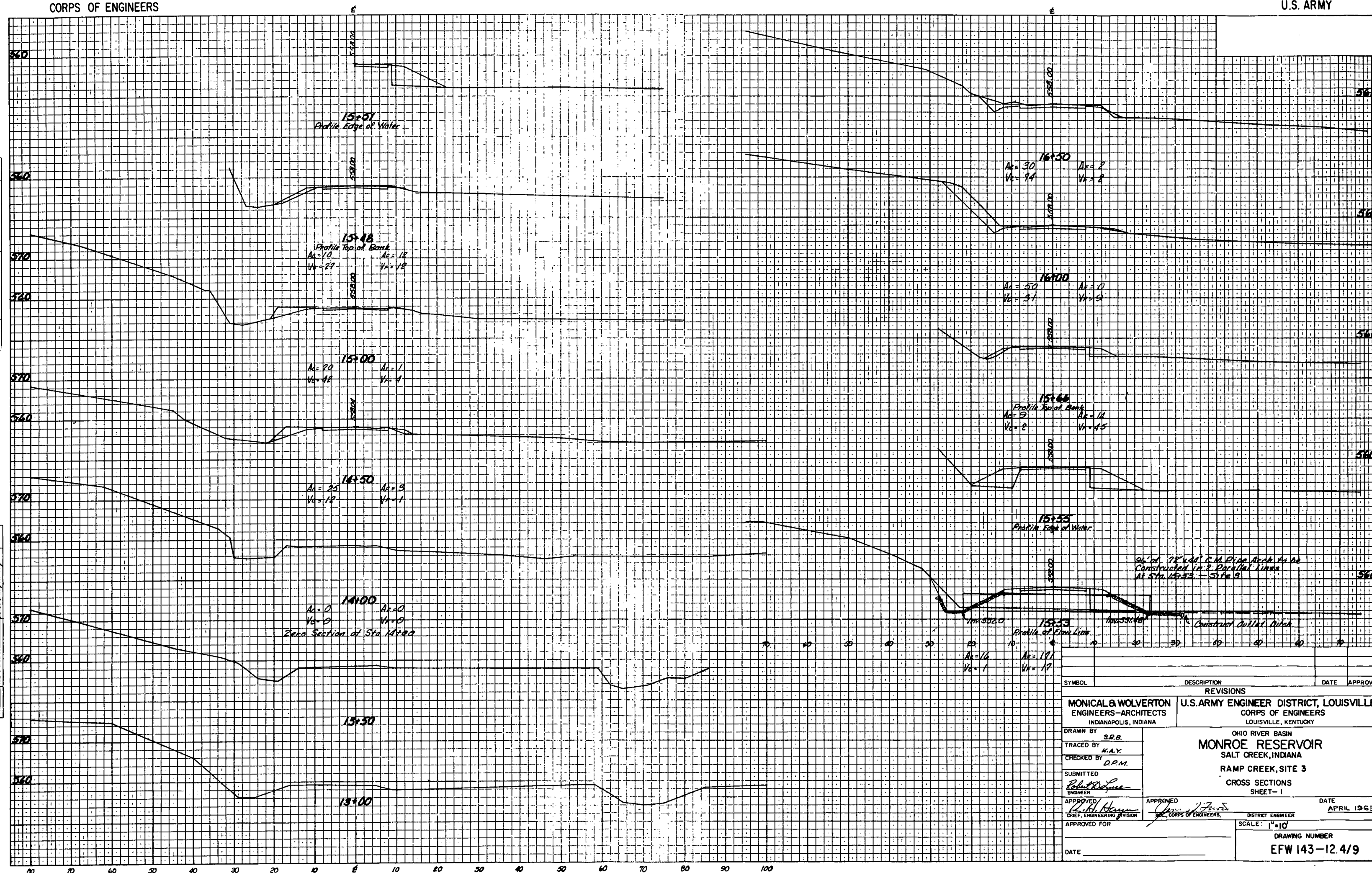


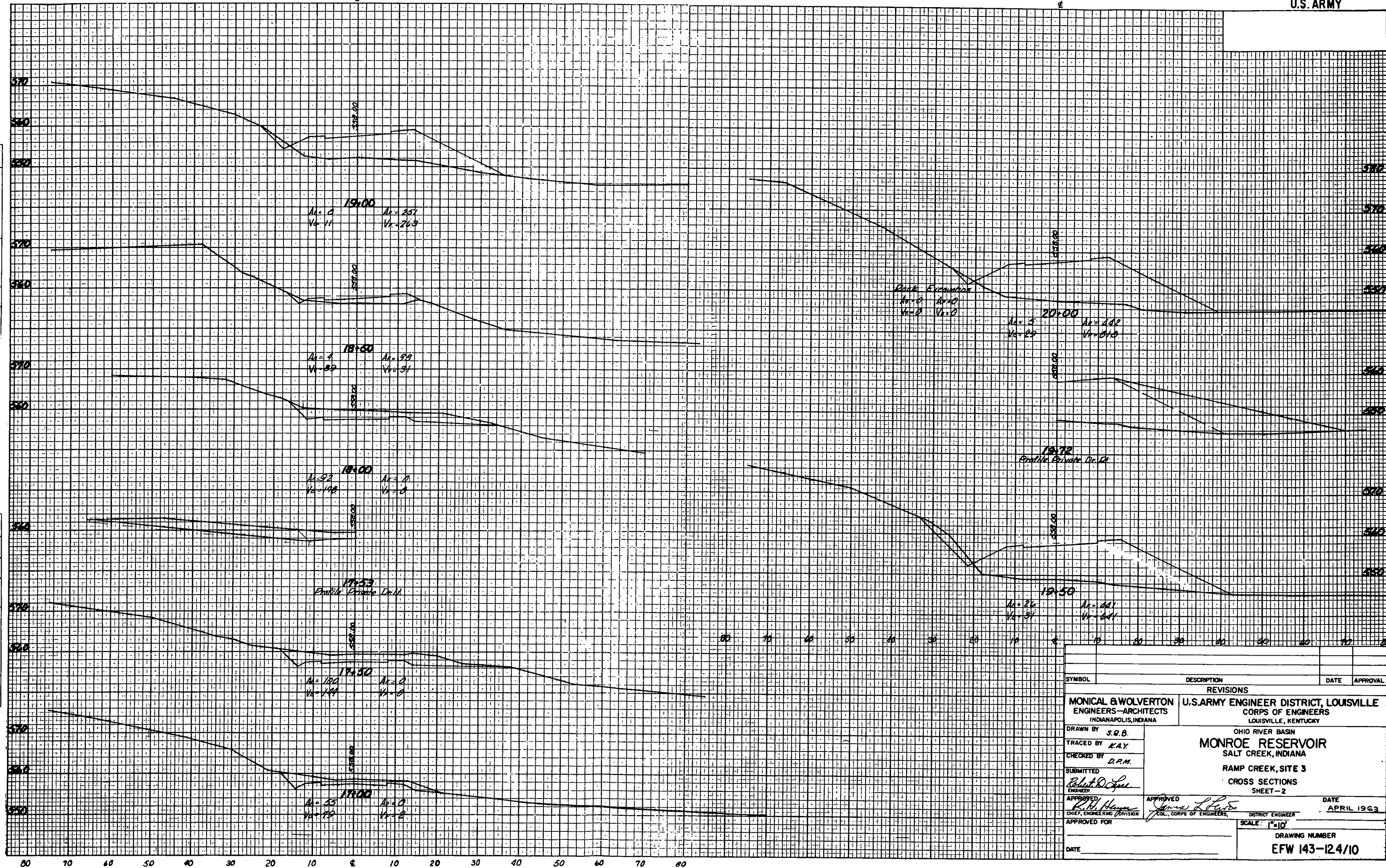


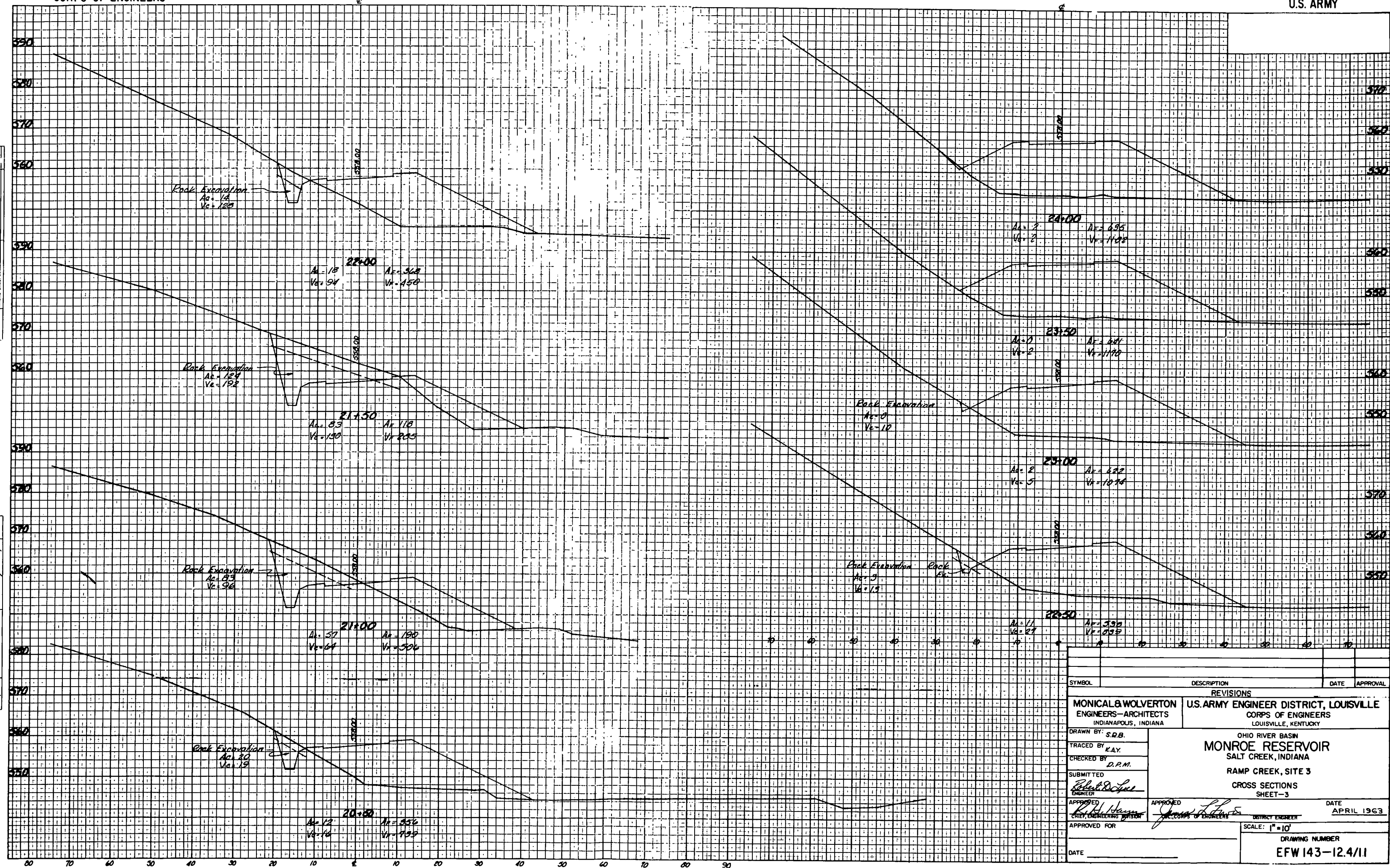
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<b>REVISIONS</b>					
<b>MONICAL &amp; WOLVERTON ENGINEERS - ARCHITECTS INDIANAPOLIS, INDIANA</b>		<b>U.S.ARMY ENGINEER DISTRICT, LOUISVILLE  CORPS OF ENGINEERS LOUISVILLE, KENTUCKY</b>			
DRAWN BY:	OHIO RIVER BASIN				
TRACED BY:	<b>MONROE RESERVOIR</b>				
CHECKED BY:	SALT CREEK, INDIANA				
SUBMITTED:	RELOCATION OF INDIANA HIGHWAY 46				
	WEST OF BRUMMETT CREEK, SITE I				
	CROSS SECTIONS				
ENGINEER	SHEET-4				
APPROVED: <i>R.H. Hume</i> CHIEF, ENGINEERING DIVISION	APPROVED <i>Gary D Lewis</i> COL., CORPUS OF ENGINEERS,				DATE <u>APRIL 1963</u>
APPROVED FOR:					SCALE: 1"=10'
DATE:					DRAWING NUMBER <b>EFW 143-12.4/7</b>



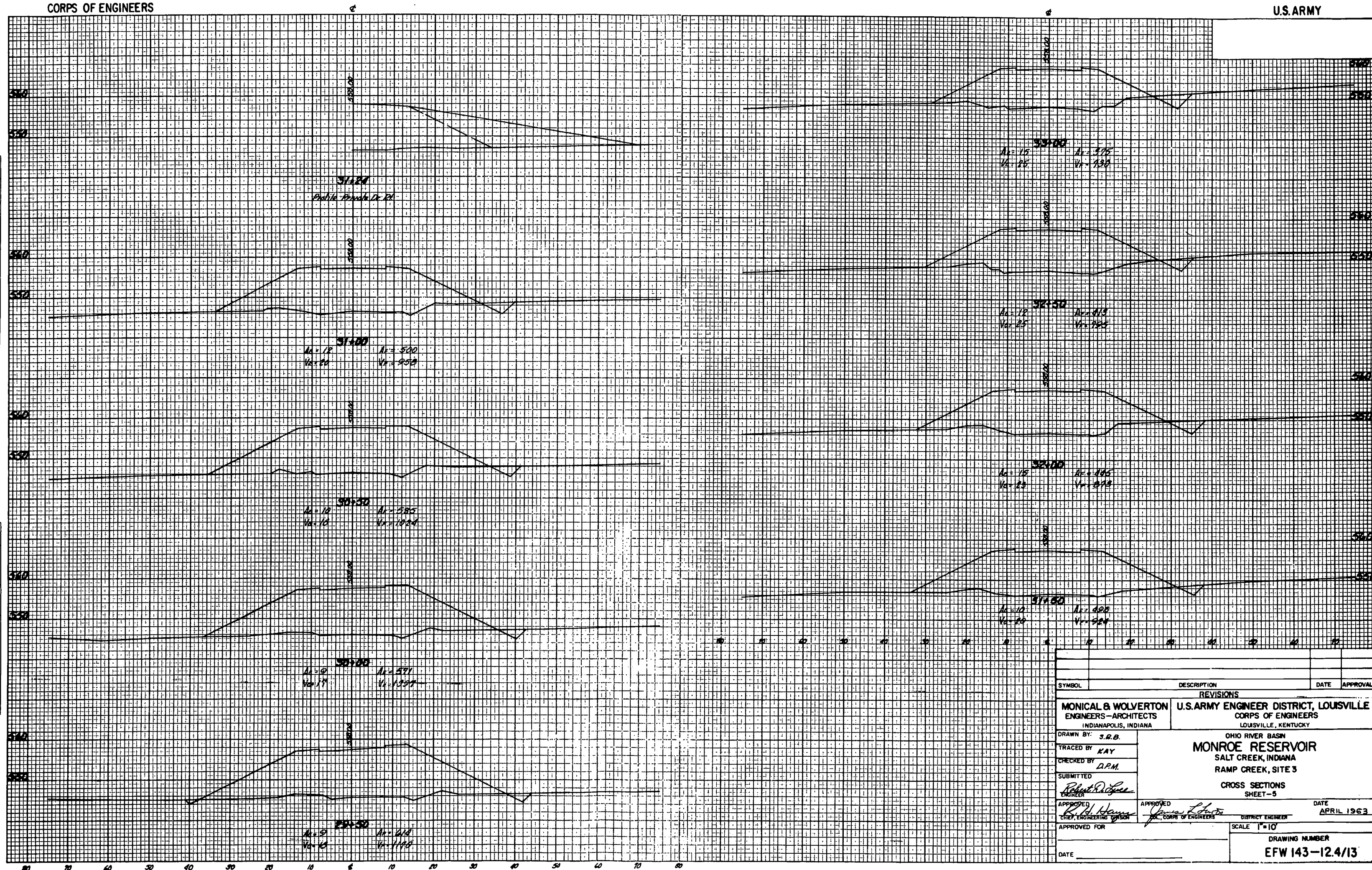


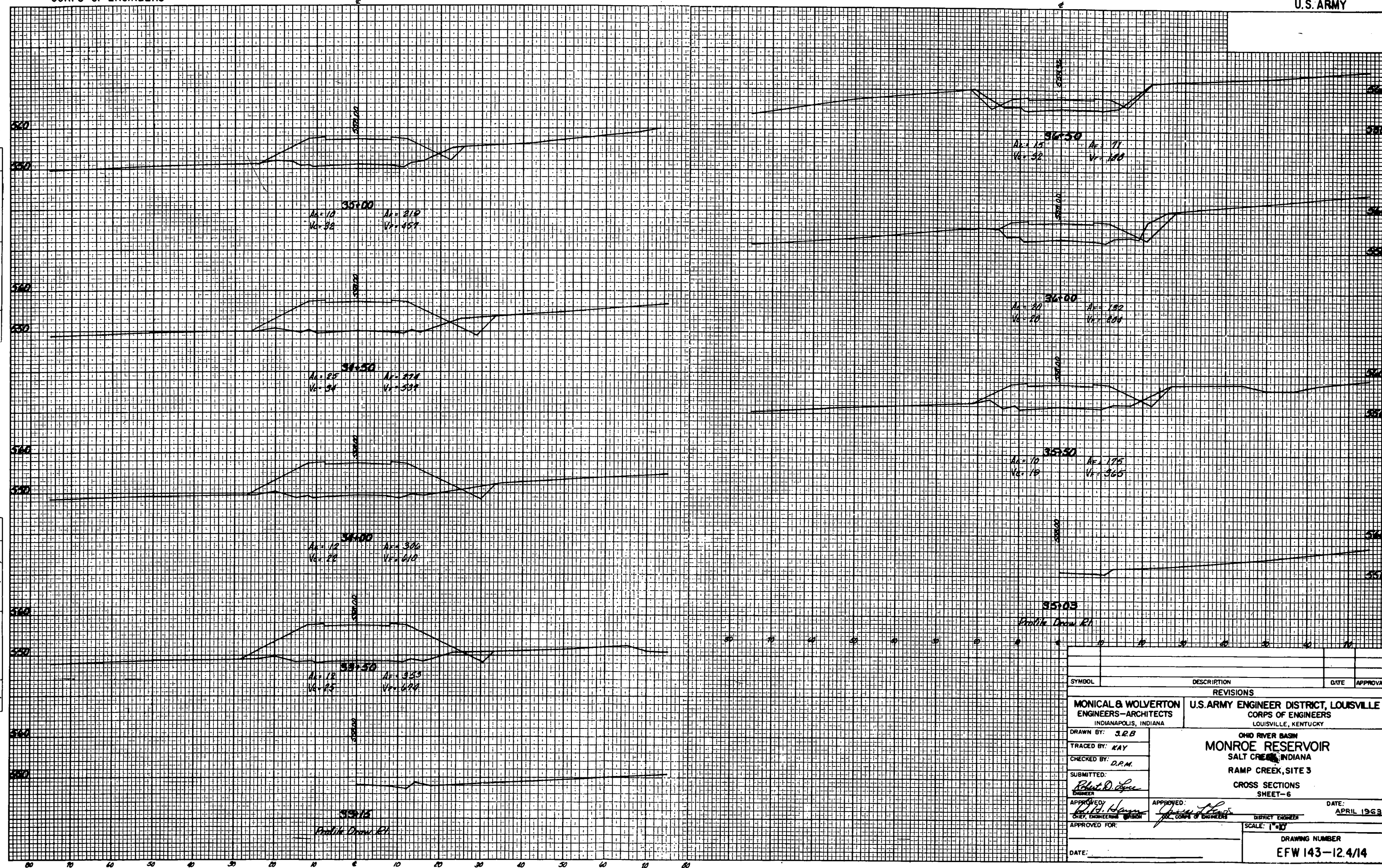
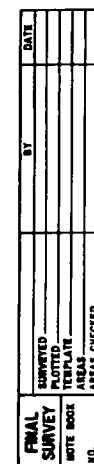




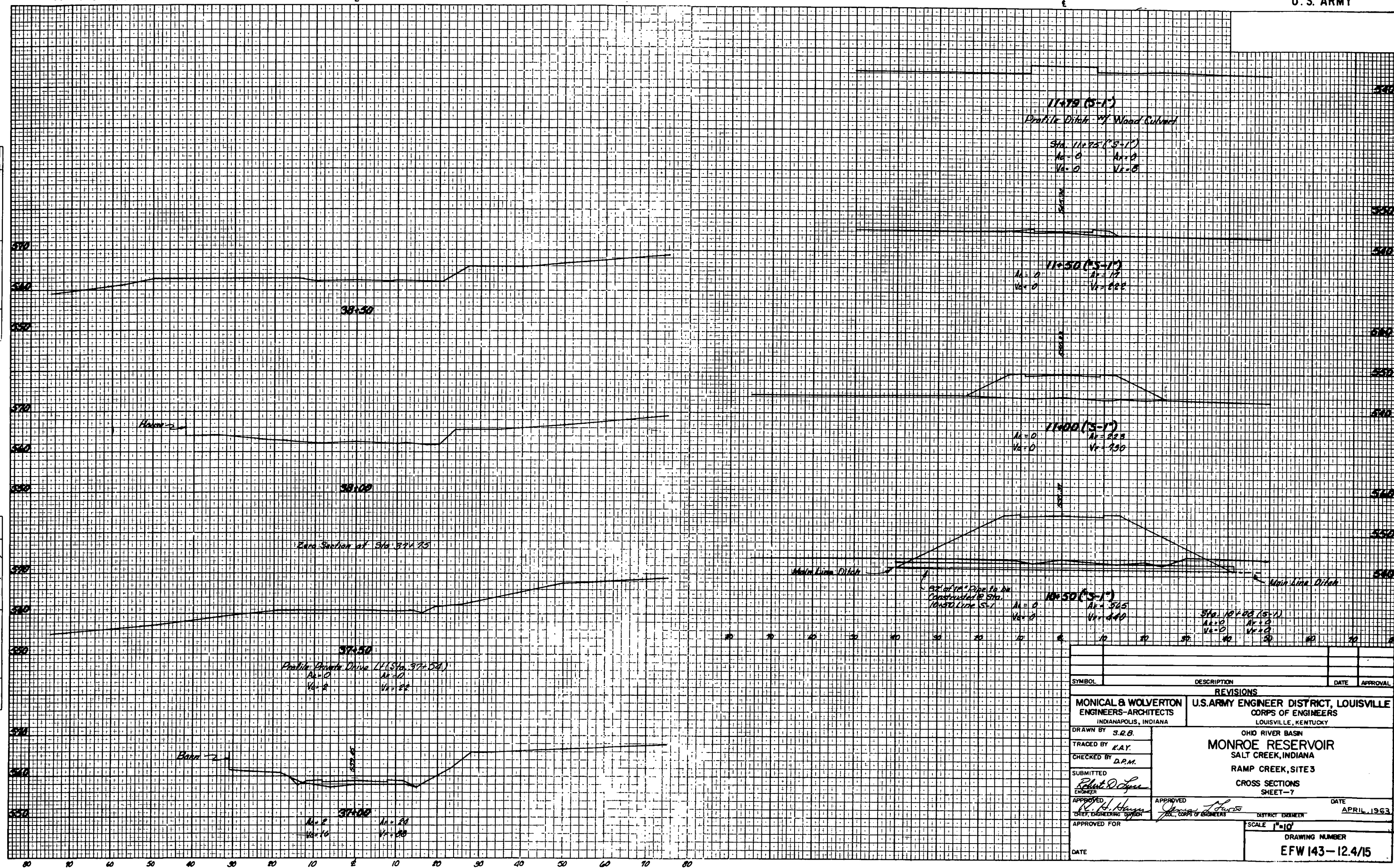




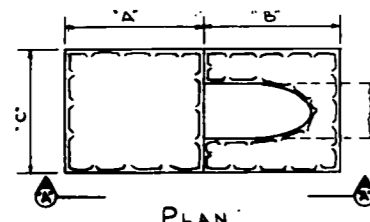




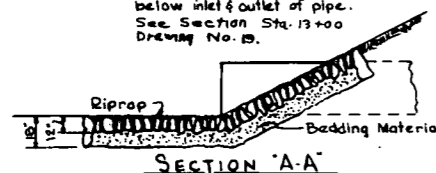
ORIGINAL SURVEY	BY	DATE
SURVEYED	J. J. WILSON	12-22-54
PLOTTED	S. BROWN	1-1-55
TEMPLATE	S. BROWN	1-2-55
AREAS	K. YEDMAN	1-2-55
AREAS CHECKED	K. YEDMAN	1-2-55



PLAN	SUPPLIED	PT	DATE
	PLOTTED	RECEIVED, MINIMUM, MAXIMUM	1-1-64
NOTE BOOK	ALLOCATION ORDERED	1-1-64	1-1-64
	ET. OF WAY ORDERED	1-1-64	1-1-64
No. NEW 94			

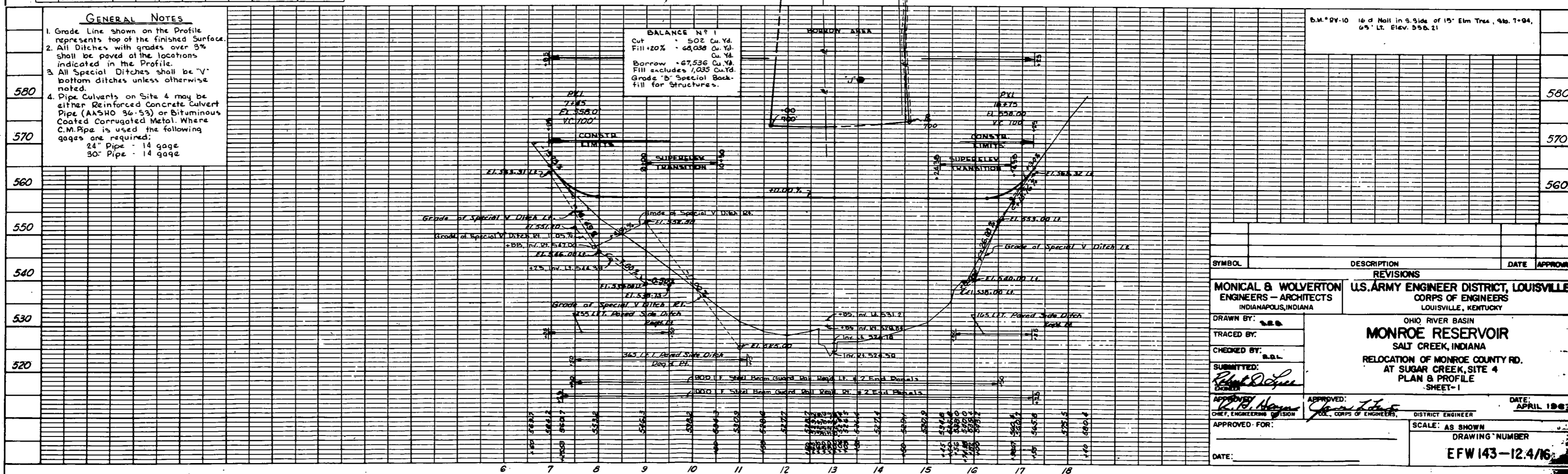


Note: Toe of slope for Str. N° 10 is below inlet & outlet of pipe.  
See Section Sta. 13+00  
Drawing No. 19.



RIPRAP SCHEDULE									
STR. NO.	TYPE OF RIPRAP	DIMENSIONS						QUANTITIES	
		INLET			OUTLET			RIPRAP	BEDDING WT.
		"A"	"B"	"C"	"A"	"B"	"C"		
10	Hand Placed	6'	6'	6'	6'	6'	6'	7 Cu. Yd.	4 Cu. Yd.
11	Hand Placed, Grouted	0	32'	30'	10'	32'	30'	93 Cu. Yd.	47 Cu. Yd.
11	Hand Placed, Grouted	10'	8'	8'	10'	8'	8'	10 Cu. Yd.	5 Cu. Yd.

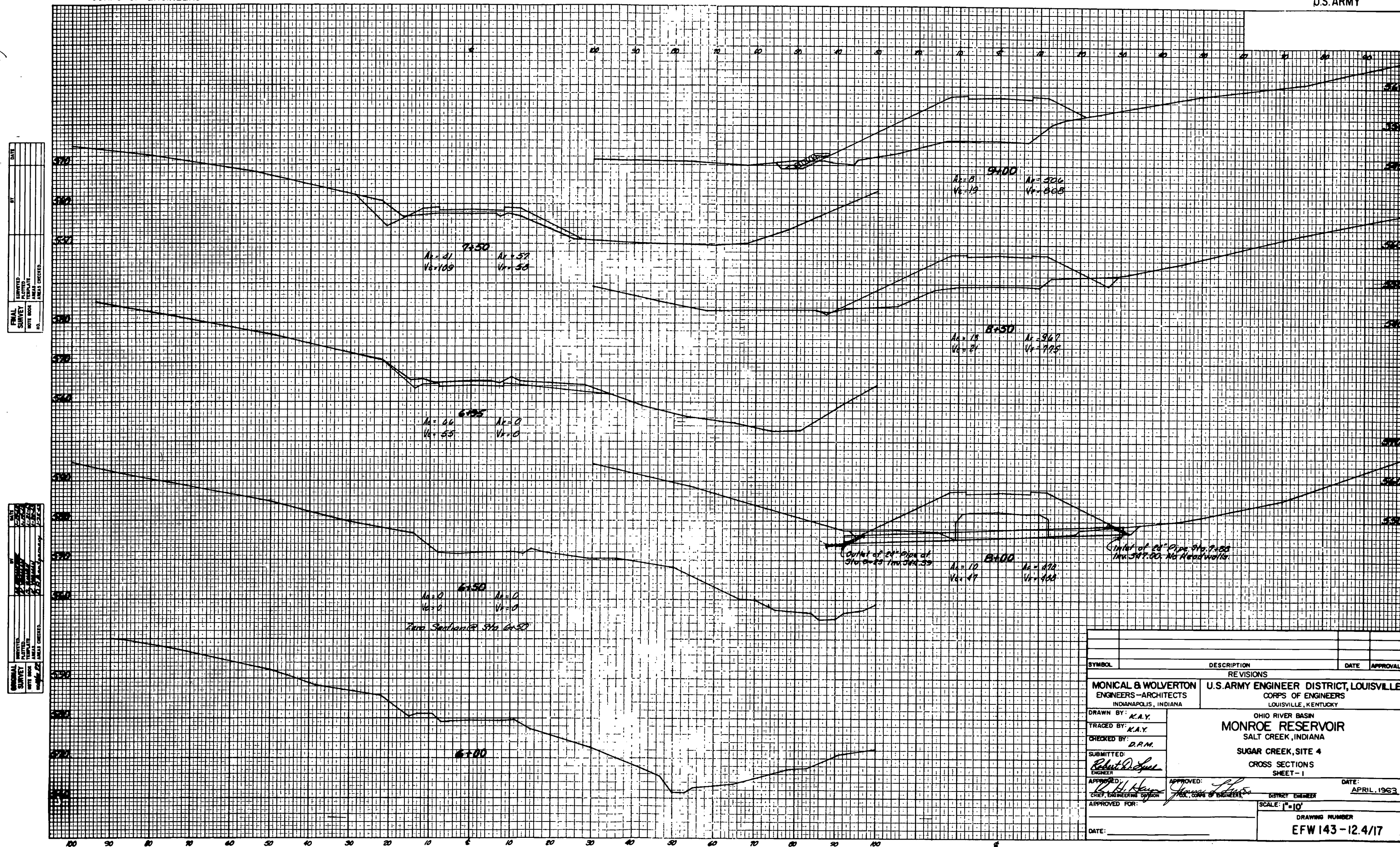
1. Grade Line shown on the Profile represents top of the finished Surface.
2. All Ditches with grades less than 3% shall be paved at the locations indicated on the Profile.
3. All Special Ditches shall be 'V' bottom ditches unless otherwise noted.
4. Pipe Culverts on Site 4 may be either Reinforced Concrete Culvert Pipe (AASHTO 36-53) or Bituminous Coated Corrugated Metal. Where C.M. Pipe is used the following gages are required:
  - 24" Pipe - 14 gage
  - 30" Pipe - 14 gage

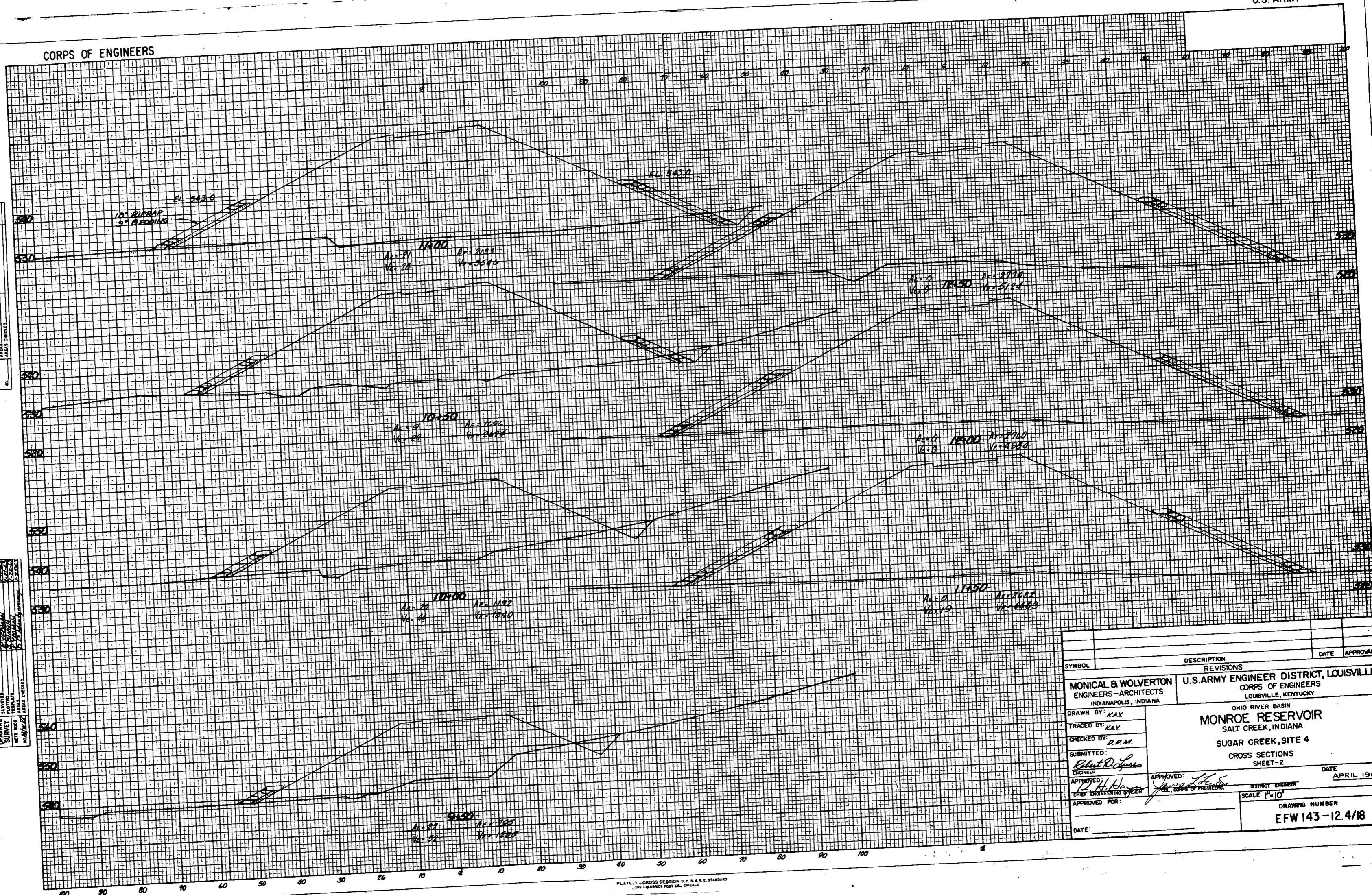


\* Note: 5'-6" With guard rail or guide posts when fill exceeds 10'

TYPICAL SECTION - SITE 4

DRAWING NUMBER  
EFW 143-12.4/16





SYMBOL		DESCRIPTION		DATE	APPROVAL
		REVISIONS			
MONICAL & WOLVERTON ENGINEERS - ARCHITECTS INDIANAPOLIS, INDIANA		U.S. ARMY ENGINEER DISTRICT, LOUISVILLE CORPS OF ENGINEERS LOUISVILLE, KENTUCKY			
DRAWN BY: K.A.Y.		OHIO RIVER BASIN MONROE RESERVOIR SALT CREEK, INDIANA SUGAR CREEK, SITE 4 CROSS SECTIONS SHEET-2			
TRACED BY: K.A.Y.					
CHECKED BY: D.P.M.					
SUBMITTED: <i>Robert D. Lewis</i> ENGINEER					
APPROVED: <i>Robert D. Lewis</i> CHIEF ENGINEERING DIVISION		APPROVED: <i>James C. Lundy</i> COL, CORPS OF ENGINEERS		DATE APRIL 1963	
APPROVED FOR:		DISTRICT ENGINEER		SCALE 1"=10'	
DATE:		DRAWING NUMBER EFW 143-12.4/18			

FINAL SURVEY	SURVEYED	BY	DATE
	PLOTTED		
	TEMPLATE		
	AREAS		
	AREAS CHECKED		
NO.	NOTE BOOK		

ORIGINAL	BY	DATE
SURVEYED	A. B. VIGOR	12-1-53
PLOTTED	P. VIGOR	1-1-54
TEMPERATURE	S. VIGOR	1-1-54
AREAS	P. VIGOR	1-1-54
AREAS CHECKED	P. B. VIGOR	1-1-54

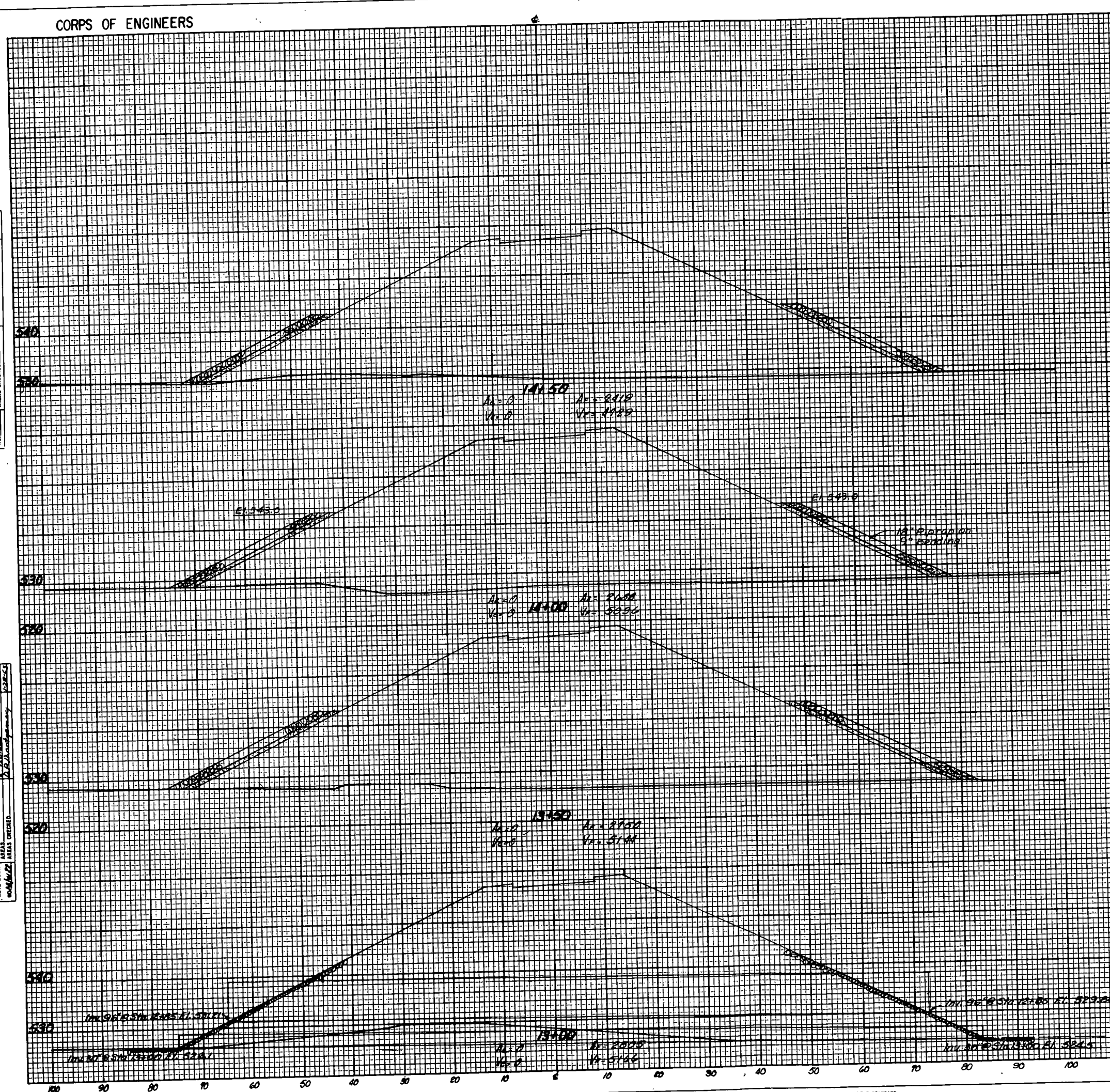
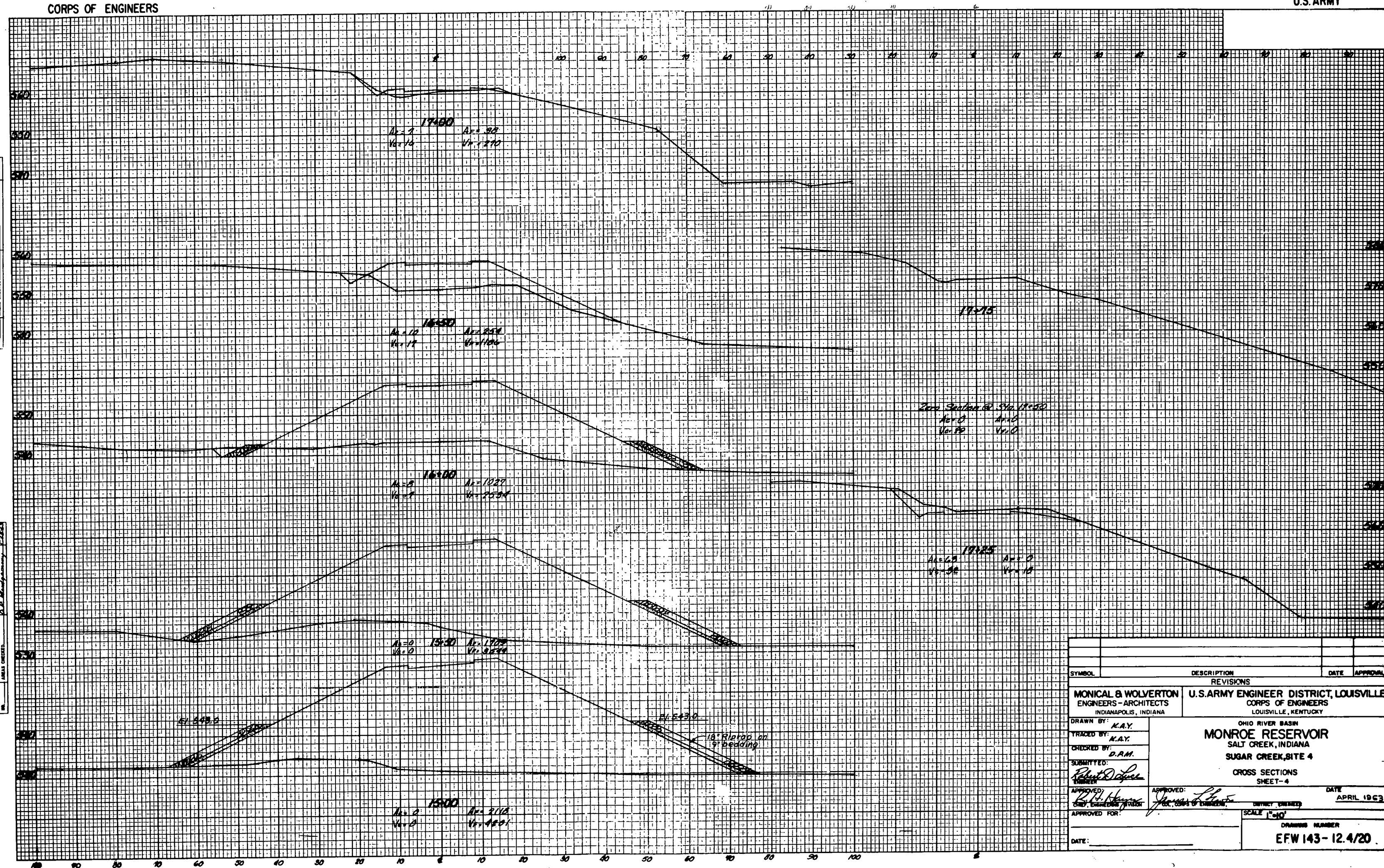


PLATE 3 —CROSS SECTION O. F. R. & R. E. STANDARD  
THE CHENGDU POST CO. CHICAGO

SYMBOL		DESCRIPTION		DATE	APPROVAL
<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p><b>MONICAL &amp; WOLVERTON</b> ENGINEERS - ARCHITECTS INDIANAPOLIS, INDIANA</p> </div> <div style="width: 60%;"> <p><b>U.S. ARMY ENGINEER DISTRICT, LOUISVILLE</b> CORPS OF ENGINEERS LOUISVILLE, KENTUCKY</p> </div> </div>					
REVISIONS					
DRAWN BY: <i>K.A.Y.</i>		<div style="text-align: center;">OHIO RIVER BASIN</div> <div style="text-align: center;"><b>MONROE RESERVOIR</b></div> <div style="text-align: center;">SALT CREEK, INDIANA</div> <div style="text-align: center;">SUGAR CREEK, SITE 4</div> <div style="text-align: center;">CROSS SECTIONS</div> <div style="text-align: center;">SHEET-3</div>			
TRACED BY: <i>K.A.Y.</i>					
CHECKED BY: <i>D.R.M.</i>					
SUBMITTED:					
<i>Robert D. Lee</i> ENGINEER		<div style="display: flex; justify-content: space-between;"> <div>           APPROVED: <i>[Signature]</i>            CHIEF, ENGINEERING DIVISION         </div> <div>           APPROVED: <i>[Signature]</i>            COL., CORPS OF ENGINEERS         </div> </div>			
APPROVED FOR:		DATE <u>APRIL 1963</u> DISTRICT ENGINEER			
DATE:		SCALE: 1" = 10' DRAWING NUMBER <b>EFW 143-12.4/19</b>			



SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
MONICAL & WOLVERTON ENGINEERS - ARCHITECTS INDIANAPOLIS, INDIANA	U.S.ARMY ENGINEER DISTRICT, LOUISVILLE CORPS OF ENGINEERS LOUISVILLE, KENTUCKY		
DRAWN BY: <i>K.A.Y.</i>	OHIO RIVER BASIN <b>MONROE RESERVOIR</b> SALT CREEK, INDIANA SUGAR CREEK, SITE 4  CROSS SECTIONS SHEET - 4		
TRACED BY: <i>K.A.Y.</i>			
CHECKED BY: <i>D.A.M.</i>			
SUBMITTED: <i>Robert D. Jones</i>			
APPROVED: <i>Robert D. Jones</i>			
DATE: <i>APRIL 1963</i>	DISTRICT ENGINEER		
APPROVED FOR: <i>James L. Hester</i>	SCALE: <i>1"=40'</i>		
DATE: _____	DRAWING NUMBER <b>EFW 143 - 12.4/20</b>		

CORPS OF ENGINEERS

UNIFIED SOIL CLASSIFICATION (Including Identification and Description)									
Major Divisions	Group Symbols	Typical Names	Field Identification Procedures (Excluding particles larger than 3 inches and basing fractions on estimated weights)	Information Required for Describing Soils	Laboratory Classification Criteria				
Coarse-grained Soils More than half of the material is larger than No. 200 sieve size. The smallest particle visible to the naked eye is larger than No. 4 sieve size. (For visual classification the U.S. No. 4 sieve may be used as equivalent to the No. 20 sieve size.)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics.  Give typical name, indicate approximate percentages of sand and gravel, maximum size, angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses.  Example: Silty sand, gravelly, about 20% hard, angular gravel particles 1/2 in. maximum size, rounded and subangular sand grains coarse to fine, about 15% nonplastic fines with low dry strength, well compacted and moist in place, alluvial sand, (SM).	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_c = \frac{D_{30}^2}{D_{10} \cdot D_{60}}$ Between one and 3 Not meeting all gradation requirements for GW				
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.			Predominately one size or a range of sizes with some intermediate sizes missing.	Atterberg limits below "A" line or $P_I$ less than 4 Above "A" line with $P_I$ between 4 and 7 are borderline cases requiring use of dual symbols.		
	GM	Silty gravels, gravel-sand-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).		$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_c = \frac{D_{30}^2}{D_{10} \cdot D_{60}}$ Between one and 3 Not meeting all gradation requirements for SW				
		GC	Clayey gravels, gravel-sand-clay mixtures.			Plastic fines (for identification procedures see CL below).	Atterberg limits above "A" line with $P_I$ greater than 7 Limits plotting in hatched zone with $P_I$ between 4 and 7 are borderline cases requiring use of dual symbols.		
	SW	Well-graded sands, gravelly sands, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.		GW, GP, SW, SP, GM, GC, SM, SC Borderline cases requiring use of dual symbols				
		SP	Poorly-graded sands, gravelly sands, little or no fines.			Predominately one size or a range of sizes with some intermediate sizes missing.	Atterberg limits below "A" line or $P_I$ less than 4 Limits plotting in hatched zone with $P_I$ between 4 and 7 are borderline cases requiring use of dual symbols.		
	SM	Silty sands, sand-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).		Use grain-size curve in identifying the fractions as given under field identification. Determine percentages of gravel and sand from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse-grained soil are classified as follows: GW, GP, SW, SP, GM, GC, SM, SC Borderline cases requiring use of dual symbols				
		SC	Clayey sands, sand-clay mixtures.			Plastic fines (for identification procedures see CL below).	Atterberg limits above "A" line with $P_I$ greater than 7 Limits plotting in hatched zone with $P_I$ between 4 and 7 are borderline cases requiring use of dual symbols.		
	Fine-grained Soils More than half of the material is smaller than No. 200 sieve size. The No. 200 sieve size is about the smallest particle visible to the naked eye.	ML, CL, OL, CH, MH, OH	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.  Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.  Organic silts and organic silty clays of low plasticity.  Inorganic clays of high plasticity, fat clays.  Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.  Organic clays of medium to high plasticity, organic silts.		Identification Procedures on Fraction Smaller than No. 40 Sieve Size Dry Strength (Crushing Characteristics) Dilatancy (Reaction to shaking) Toughness (Consistency near PL)	Give typical name, indicate degree and character of plasticity, amount and maximum size of coarse grains, color in wet condition, odor if any, local or geologic name, and any other pertinent descriptive information, and symbol in parentheses.  For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions.  Example: Clayey silt, brown, slightly plastic small percentage of fine sand, numerous vertical root holes firm and dry in place, loess (ML).			
							ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.	None to slight
CL				Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.			Medium to high	None to very slow	Medium
OL				Organic silts and organic silty clays of low plasticity.			Slight to medium	Slow	Slight
CH				Inorganic clays of high plasticity, fat clays.			High to very high	None	High
MH				Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.			Slight to medium	Slow to none	Slight to medium
Highly Organic Soils	Pt	Peat and other highly organic soils.	Readily identified by color, odor, spongy feel and frequently by fibrous texture.						

(1) Boundary classifications: Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well-graded gravel-sand mixture with clay binder. (2) All sieve sizes on this chart are U.S. standard.

FIELD IDENTIFICATION PROCEDURES FOR FINE-GRAINED SOIL OR FRACTIONS

These procedures are to be performed on the minus No. 40 sieve size particles, approximately 1/64 in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

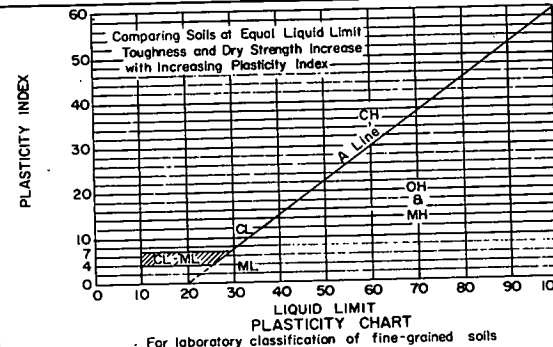
Dilatancy (Reaction to shaking)  
After removing particles larger than No. 40 sieve size, prepare a pot of soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky. Place the pot in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the soil which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pot stiffens, and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.  
Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (Crushing characteristics)  
After removing particles larger than No. 40 sieve size, mold a pot of soil to the consistency of putty, adding water if necessary. Allow the pot to dry completely by oven, sun, or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.  
High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (Consistency near plastic limit)  
After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size, is molded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eighth inch in diameter. The thread is then folded and rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.  
After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.  
The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line.  
Highly organic clays have a very weak and spongy feel of the plastic limit.

Adapted by Corps of Engineers and Bureau of Reclamation, January 1952

THE ABOVE CHART CONSISTS OF COMPLETE DATA AS INCLUDED IN CORPS OF ENGINEERS' UNIFIED SOIL CLASSIFICATION SYSTEM. SOIL CLASSIFICATION NOT APPLICABLE TO THIS PROJECT SHALL BE DISREGARDED.



**LEGEND**

F = FILL  
T = TOP SOIL  
OB = OVERBURDEN (SEE GENERAL NOTE 4)  
SS = SANDSTONE  
SH = SHALE  
SL = SILTSTONE  
LS = LIMESTONE  
GR = GRANITE  
CO = COAL  
UC = UNDERCLAY  
WC = WEATHERED  
W = GROUND WATER, ELEV & DATE (SEE GENERAL NOTE 2)  
WC = WATER CONTENT (EXPRESSED IN % DRY WEIGHT) DATE  
C = CLASSIFICATION VERIFIED BY LABORATORY TESTS (SEE GENERAL NOTE 5)

DC-10 BORING NO. & DATE MADE  
7-26-56

LT = LIGHT  
DK = DARK  
SL = SLIGHTLY  
MOD = MODERATELY  
MED = MEDIUM  
COMP = COMPACT  
HD = HARD  
TR = TRACE  
F/W = FREE WATER

W = WITH  
GR = GRAIN  
OCC = OCCASIONAL  
BD = BEDDED OR BEDS  
INTBD = INTERBEDDED  
LAM = LAMINAE  
XLYN = CRYSTALLINE  
ARGL = ARGILLACEOUS  
DOL = DOLOMITE  
CAL = CALCAREOUS  
CARB = CARBONACEOUS  
AREN = ARENACEOUS  
VAU = VAUGHNITE  
FOS = FOSSILIFEROUS  
FRAG = FRAGMENTS  
DIAG = DIAGONAL  
ALT = ALTERNATING  
VERT = VERTICAL  
HOR = HORIZONTAL  
FRAC = FRACTURE  
CON = CONGLOMERATE  
X-BD = CROSSBEDDING  
S/P = SHEAR PLANE  
V/J = VERTICAL JOINT  
JT = JOINT  
SOL = SOLUTION  
CAV = CAVITY OR UNCONSOLIDATED  
MICA = MICACEOUS  
STY = STYLOLITIC  
GEO = GEODIFEROUS  
QTZ = QUARTZ  
PS = PISTON SAMPLER

LEGEND FEATURES NOT APPLICABLE TO THIS PROJECT SHALL BE DISREGARDED

**GENERAL NOTES**

- REFUSAL IS DEFINED AS THE POINT BEYOND WHICH FURTHER PENETRATION WAS IMPOSSIBLE WITH THE EXPLORATION METHOD USED. SEE METHODS OF EXPLORATION THIS SHEET INDICATING MEANS BY WHICH THE BORINGS WERE ADVANCED.
- WATER ELEVATIONS INDICATED (W) IN CORE (C), FISHTAIL (F), DENSON (U), AND WASH (W) BORINGS MAY HAVE BEEN INFLUENCED BY TRAPPED DRILLING WATER AND SHOULD NOT BE CONSTRUED AS INDICATING THE TRUE GROUND WATER LEVEL.
- GROUND WATER LEVELS WILL VARY IN ACCORDANCE WITH RAINFALL AND STREAM STAGES. THEREFORE, ACTUAL LEVEL OF GROUND WATER ON ANY DATE OTHER THAN THAT SHOWN ON THE LOGS MUST BE DETERMINED BY SEPARATE OBSERVATIONS. THE OMISSION OF GROUND WATER ELEVATIONS SHALL NOT NECESSARILY BE CONSTRUED AS INDICATING THE ABSENCE OF GROUND WATER AT A PARTICULAR BORING LOCATION.
- WHEREVER THE METHOD OF EXPLORATION PRECLUDED THE POSSIBILITY OF RECOVERING SAMPLES ABOVE ROCK, SUITABLE FOR EXAMINATION OR TESTS, THE MATERIAL IS DENOTED AS OVERBURDEN, HOWEVER, WHERE POSSIBLE THE OVERBURDEN RESIDUE IN THE DRILLING WATER WAS VISUALLY CLASSIFIED IN THE FIELD AND IS SO DENOTED ON THE BORING LOG.
- CLASSIFICATIONS AND PHYSICAL CHARACTERISTICS OF SOIL AND ROCK AS SHOWN ON THE LOGS WERE DETERMINED IN THE FIELD AND LATER SUPPLEMENTED BY ANALYSIS MADE BY THE DISTRICT GEOLOGIST AND THE LABORATORY TECHNICIANS. CLASSIFICATIONS OF MATERIALS VERIFIED BY ATTERBERG LIMIT TESTS ARE DENOTED BY AN ASTERISK. ATTERBERG LIMITS WERE DETERMINED IN ACCORDANCE WITH A.S.T.M. D-423-54T AND A.S.T.M. D-424-54T.
- FIELD BOOKS, FIELD LOGS, LABORATORY LOGS (PRESENTING THE RESULTS OF LABORATORY TESTS FOR SHEAR, CONSOLIDATION, PERMEABILITY, ETC. WHEN PERFORMED) AND EDITED LOGS MAY BE VIEWED IN THE OFFICE OF THE DISTRICT ENGINEER, U.S. ARMY ENGINEER DISTRICT, LOUISVILLE, KENTUCKY, 830 WEST BROADWAY, LOUISVILLE, KENTUCKY. FAILURE OF THE CONTRACTOR TO AVAIL HIMSELF OF THE INFORMATION REPRESENTED BY THE BORING LOGS, INCLUDING LABORATORY TEST RESULTS, SHALL NOT BE GROUNDS FOR A CLAIM THAT THE GOVERNMENT WITHHELD INFORMATION ON SUBSURFACE CONDITIONS.
- THE TERM "LOST WATER" AS SHOWN ON THE LOGS INDICATES A QUANTITY OF DRILLING WATER LOST IN THE DRILL HOLE IN EXCESS OF 40 GALLONS PER MINUTE.

**METHODS OF EXPLORATION**

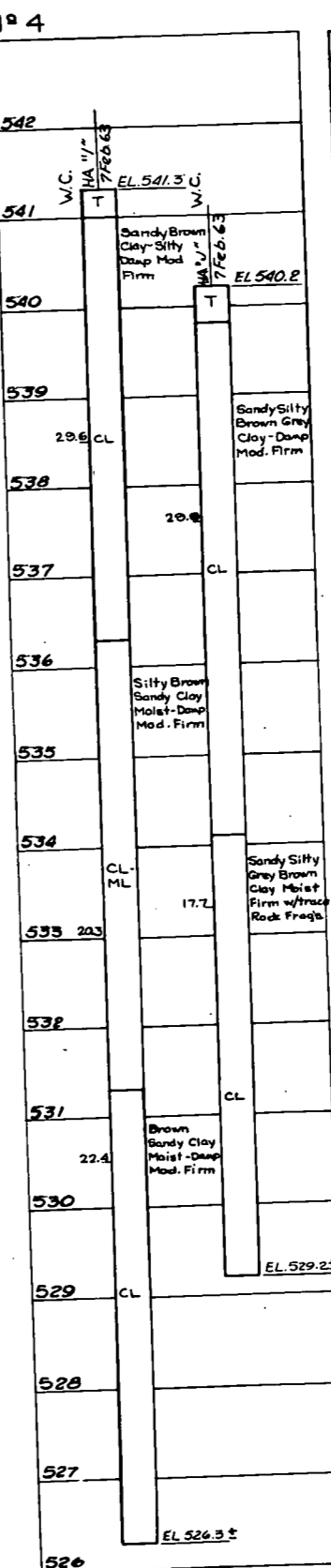
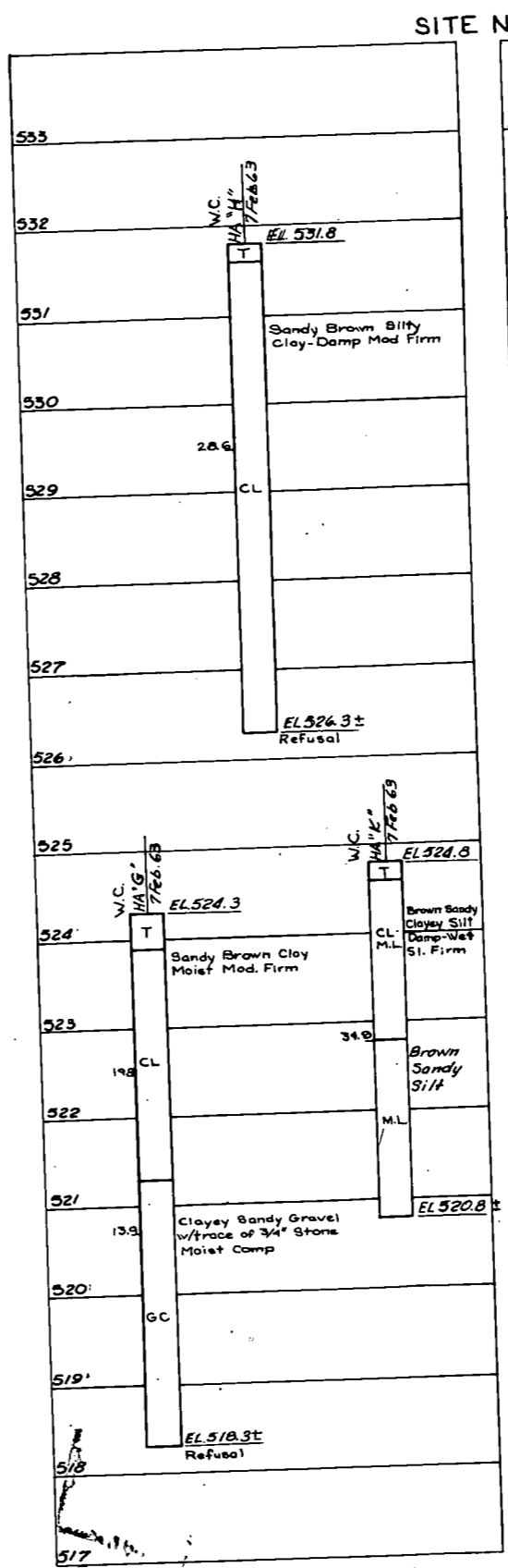
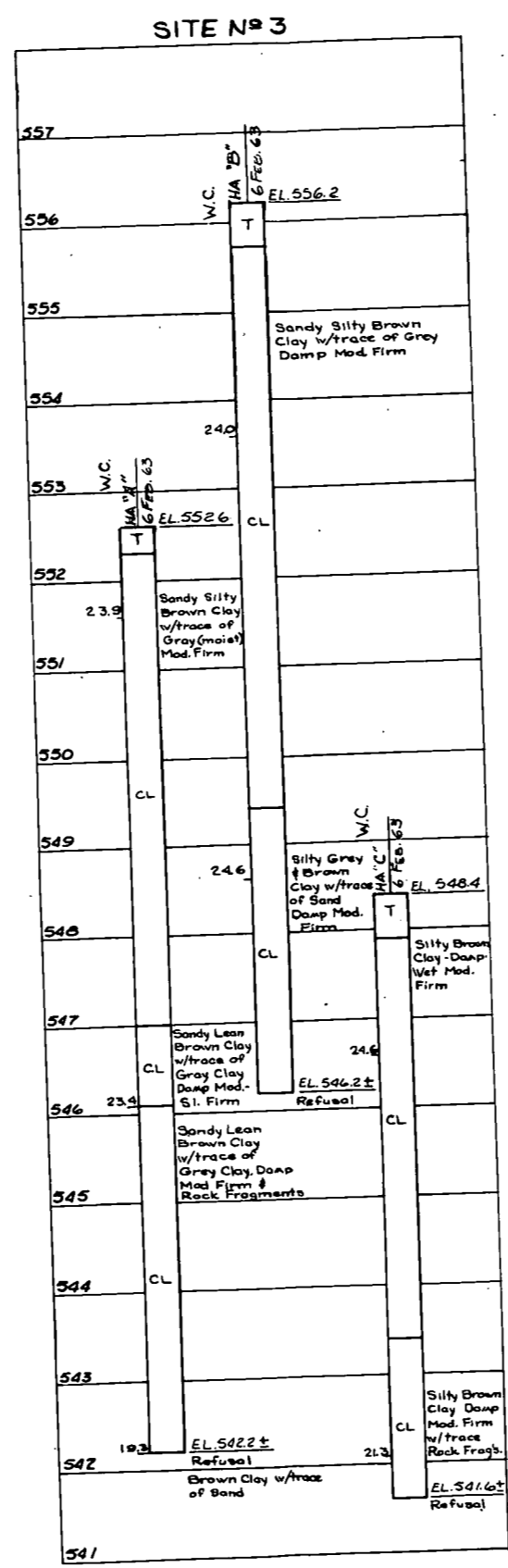
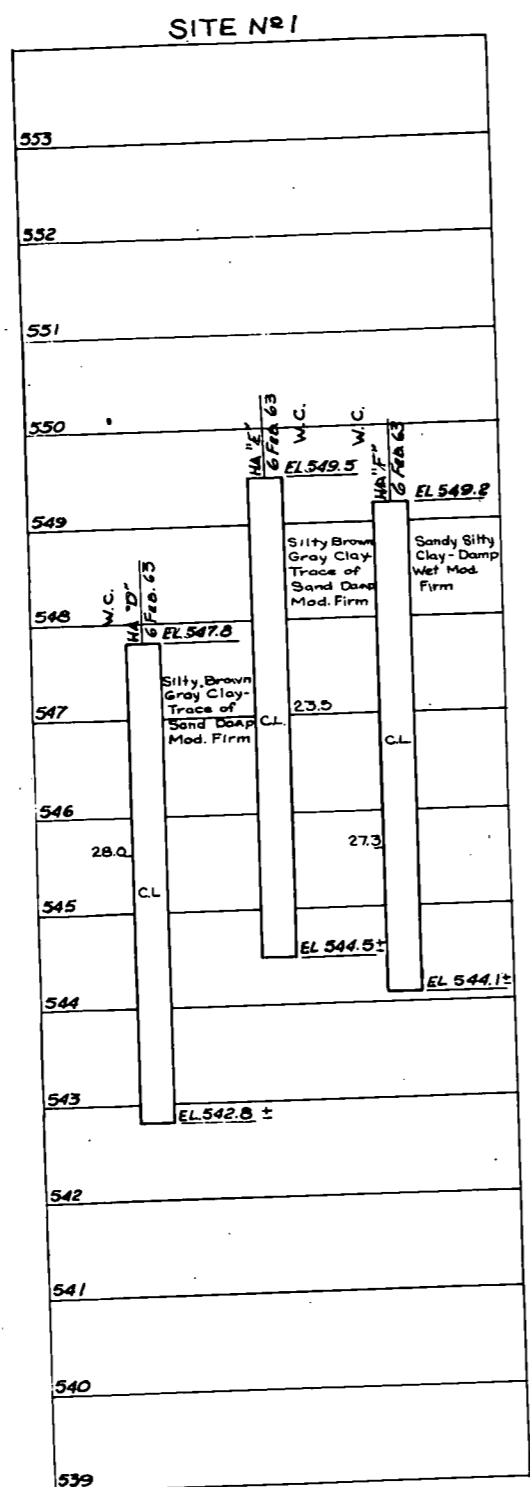
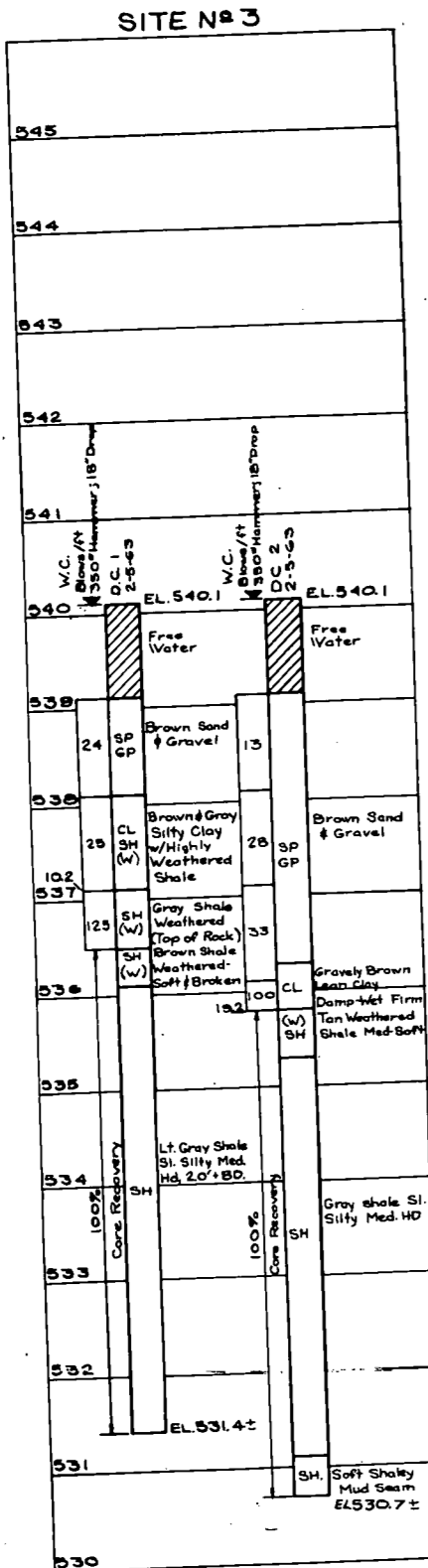
HA = HAND AUGER  
TA = TOWER AUGER  
CB = CORE BORING  
DS = DRIVE SAMPLER  
FIS = FISHTAIL  
WD = WASH BORING  
TR = TRENCH  
TEST = TEST PIT  
RB = ROCK BIT  
PR = PROBE ROD

NOTE: THE LETTER DESIGNATION USED BEFORE BORING NUMBER INDICATES THE METHOD OF EXPLORATION. FOR EXAMPLE: DC = DRIVE SAMPLER AND CORE BORING.

DRIVE SAMPLES WERE TAKEN WITH A 2 1/2" I.D. - 3" O.D. X 5' SOLID BARREL SAMPLER USING A 350# HAMMER WITH AN 18" DROP, UNLESS OTHERWISE INDICATED ON GRAPHIC LOGS.

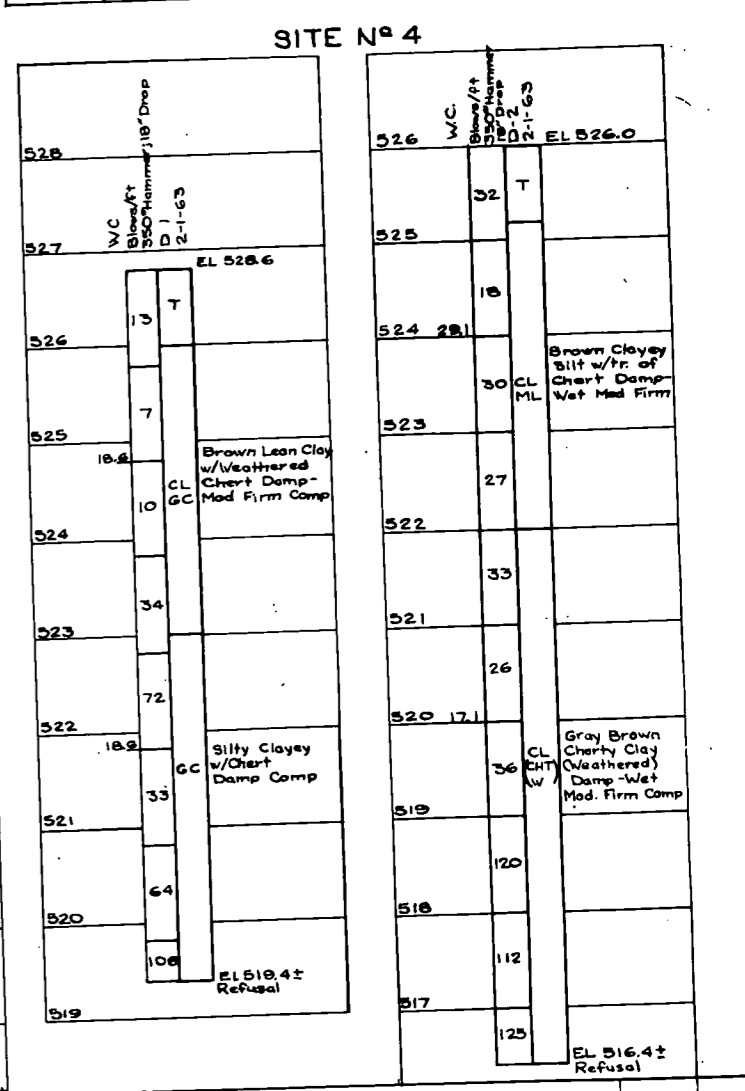
SYMBOL		DESCRIPTION	DATE	APPROVAL
MONICAL & WOLVERTON ENGINEERS-ARCHITECTS INDIANAPOLIS, INDIANA				
OHIO RIVER BASIN <b>MONROE RESERVOIR</b> SALT CREEK, INDIANA ROAD RELOCATION SITES 1-3&4 <b>SOIL CLASSIFICATION CHARTS AND LEGENDS</b>				
DRAWN BY: D.P.M.	DATE: APRIL 1963			
CHECKED BY: R.D.L.	APPROVED: [Signature] DISTRICT ENGINEER			
SUBMITTED: [Signature] ENGINEER	APPROVED FOR: [Signature] CHIEF ENGINEERING DIVISION			
DATE:		SCALE: AS SHOWN		
		DRAWING NUMBER: EFW 143-12.4/21		

CORPS OF ENGINEERS

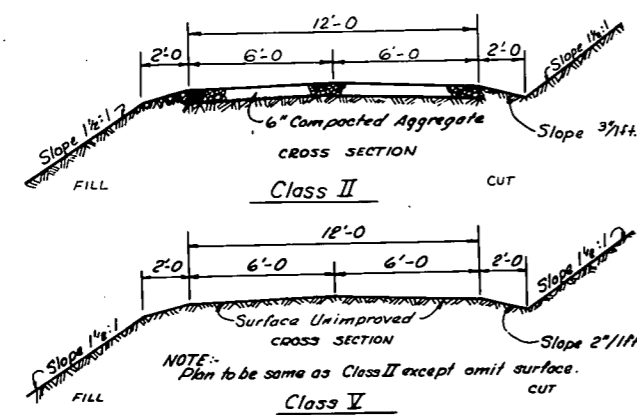
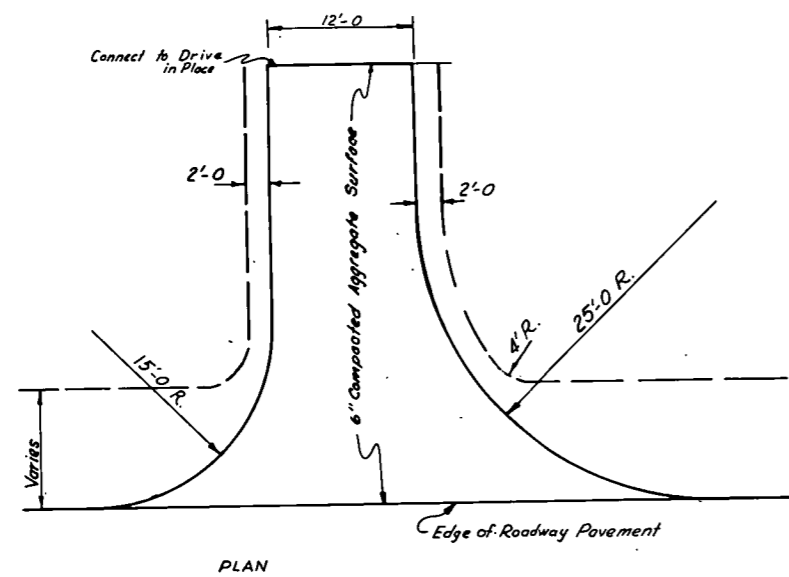


**PROBINGS FOR SITE NO.3**

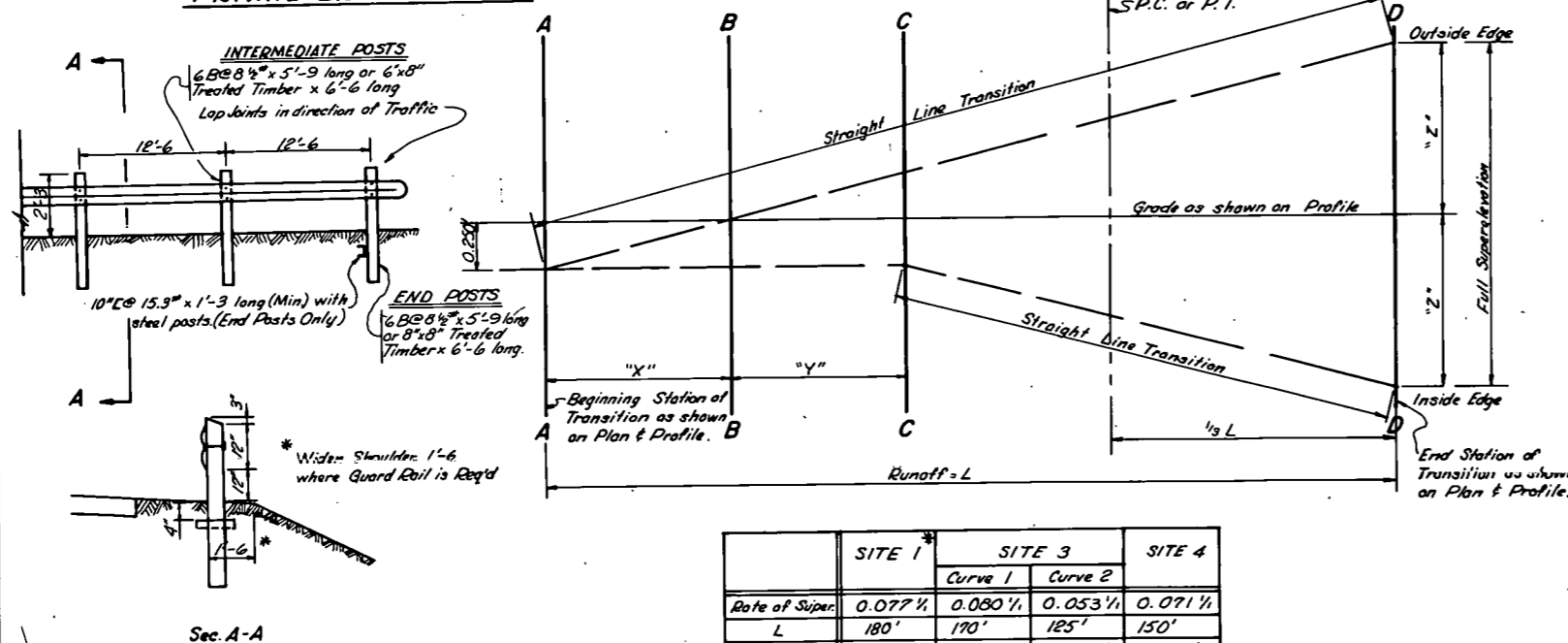
No	Station	Dist. or Lt.	Depth to Refusal	Ground Elev.	Refusal Elev.
P-1	20+50	21' Lt.	2.1	562.0	559.9 ±
P-2	21+00	2' Lt.	3.3	559.1	555.8 ±
P-3		21.5' Lt.	2.7	568.2	565.5 ±
P-4	21+50	8.5' Lt.	3.2	559.1	555.9 ±
P-5		21.5' Lt.	3.1	569.1	566.0 ±
P-6	22+00	21.5' Lt.	3.6	562.2	558.6 ±
P-7	22+50	22.5' Lt.	3.1	555.2	552.1 ±



SYMBOL		DESCRIPTION	DATE	APPROVAL
<p><b>REVISIONS</b></p> <p>MONICAL &amp; WOLVERTON ENGINEERS-ARCHITECTS INDIANAPOLIS, INDIANA</p> <p>U.S. ARMY ENGINEER DISTRICT, LOUISVILLE CORPS OF ENGINEERS LOUISVILLE, KENTUCKY</p> <p>OHIO RIVER BASIN MONROE RESERVOIR SALT CREEK, INDIANA</p> <p><b>BORING LOGS AND PROBINGS</b></p> <p>SHEET-2</p> <p>APPROVED: <i>[Signature]</i> DISTRICT ENGINEER</p> <p>APPROVED: <i>[Signature]</i> CHIEF, ENGINEERING DIVISION</p> <p>APPROVED FOR: <i>[Signature]</i></p> <p>DATE: <i>[Signature]</i></p> <p>SCALE: <i>[Signature]</i></p> <p>DRAWING NUMBER EFW 143-12.4/22</p>				



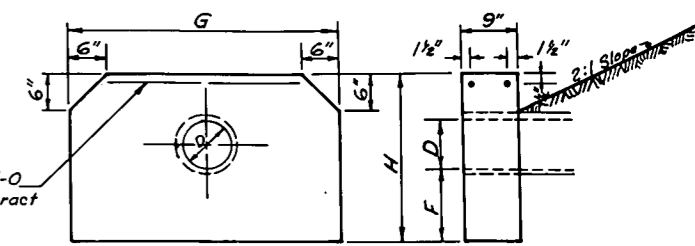
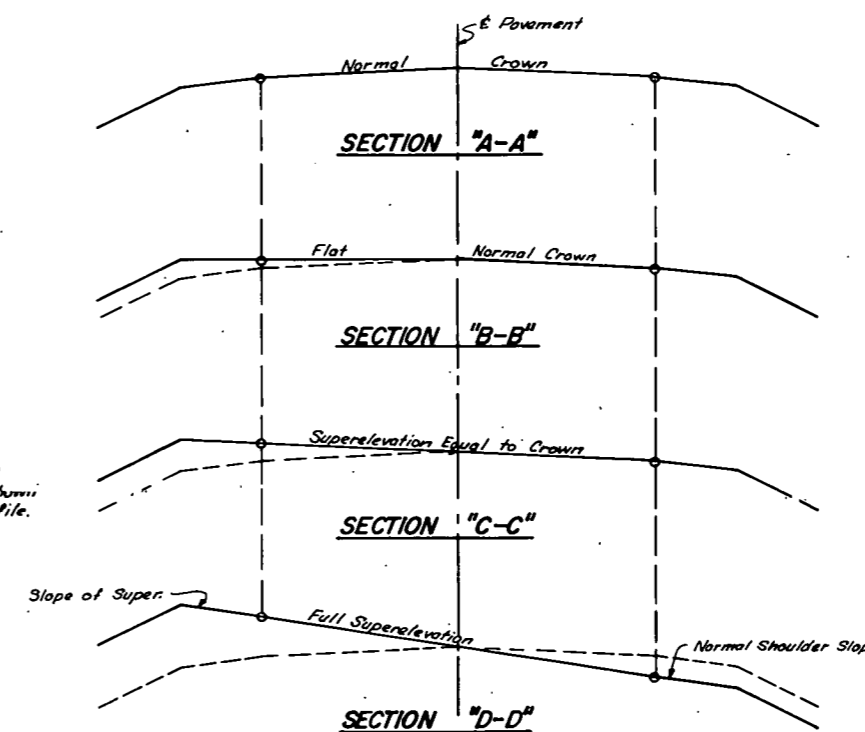
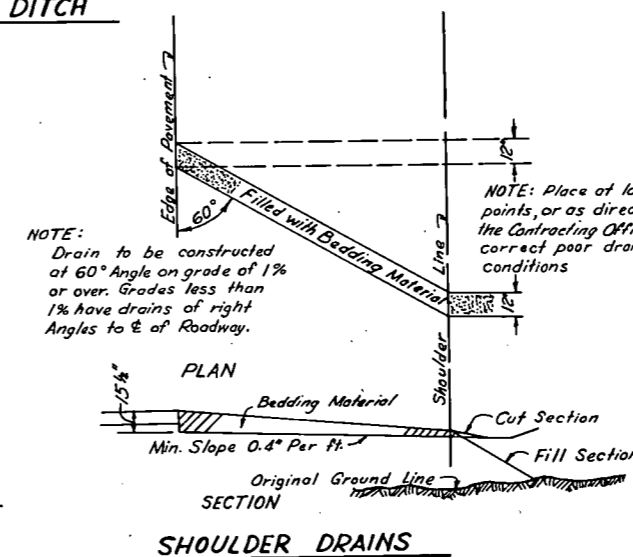
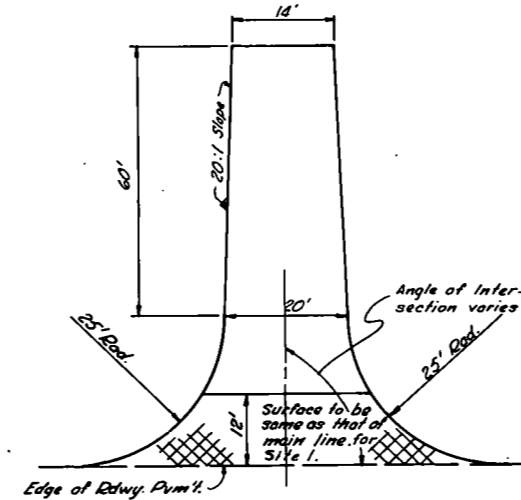
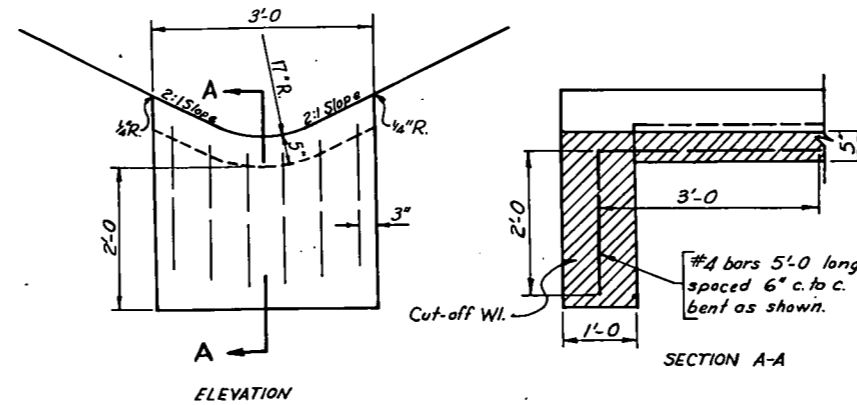
## PRIVATE DRIVE DETAILS



	SITE 1	SITE 3		SITE 4
		Curve 1	Curve 2	
Rate of Super:	0.077 1/4	0.080 1/4	0.053 1/4	0.071 1/4
L	180'	170'	125'	150'
"X"	38.33'	47.75'	46.36'	45.84'
"Y"	38.33'	47.75'	46.36'	45.84'
"Z"	0.924'	0.640'	0.424'	0.568'

\* Data applies only to Runoff @ 19+95.12 with limits of Super. as shown on Sht. 12.4/3 - For Runoff Data @ Sta. 8+38.46. See Sht. EFW-12.4/24.

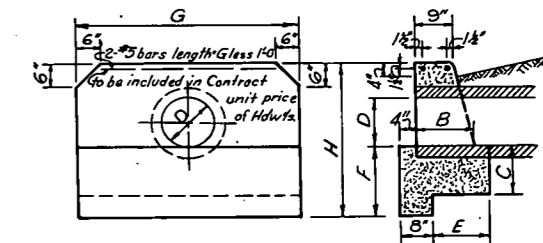
## SUPERELEVATION TRANSITION FOR CURVES



Pipe	Span	Rise	F	H	B	G	Cu. Yds. Conc. 2-Headwalls
18"	11"	1'-0"	2'-6"	0'-9"	3'-4"	0'-45"	0.45
22"	13"	1'-0"	2'-9"	0'-9"	4'-3"	0'-64"	0.64
25"	16"	1'-0"	3'-0"	0'-9"	4'-9"	0'-78"	0.78
29"	18"	1'-0"	3'-0"	0'-9"	5'-6"	0'-90"	0.90
36"	22"	1'-0"	3'-6"	1'-0"	6'-8"	1'-77"	1.77
43"	27"	1'-0"	4'-0"	1'-0"	8'-0"	2'-35"	2.35

D	F	H	B	G	Cu. Yds. Conc. 2-Headwalls
8"	1'-0"	2'-4"	0'-9"	3'-8"	0.46
10"	1'-0"	2'-6"	0'-9"	3'-10"	0.52
12"	1'-0"	2'-8"	0'-9"	4'-0"	0.58
15"	1'-0"	3'-0"	0'-9"	4'-3"	0.69
18"	1'-0"	3'-3"	0'-9"	4'-6"	0.80
24"	1'-0"	3'-9"	0'-9"	6'-0"	1.24
30"	1'-6"	4'-10"	1'-0"	7'-0"	2.49
36"	1'-6"	5'-4"	1'-0"	8'-0"	3.14

## PRIVATE DRIVE HEADWALLS



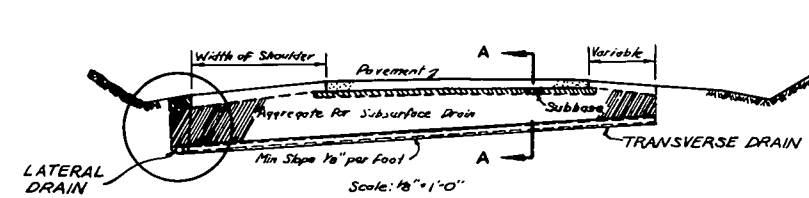
D	H	C	F	E	B	G	Cu. Yds. Conc. 2-Headwalls
12"	3'-3"	1'-0"	1'-6"	1'-2"	4'-6"	1'-28"	1.28
15"	3'-5"	1'-0"	1'-6"	1'-3"	5'-6"	1'-71"	1.71
18"	3'-9"	1'-1"	1'-7"	1'-4"	6'-6"	2'-29"	2.29
24"	4'-5"	1'-2"	1'-8"	1'-6"	8'-6"	3'-75"	3.75
30"	5'-1"	1'-3"	1'-9"	1'-7"	10'-0"	5'-78"	5.78
36"	5'-10"	1'-5"	1'-11"	1'-9"	12'-9"	8'-12"	8.12

Pipe	Span	Rise	H	C	F	E	B	G	Cu. Yds. Conc. 2-Headwalls
18"	11"	3'-3"	1'-0"	1'-6"	1'-2"	1'-2"	5'-0"	1'-41"	1.41
22"	13"	3'-6"	1'-0"	1'-6"	1'-3"	1'-3"	6'-2"	1'-93"	1.93
25"	16"	3'-8"	1'-0"	1'-6"	1'-3"	1'-3"	7'-0"	2'-20"	2.20
29"	18"	3'-10"	1'-0"	1'-6"	1'-4"	1'-4"	8'-6"	2'-99"	2.99
36"	22"	4'-3"	1'-0"	1'-6"	1'-5"	1'-5"	10'-4"	4'-72"	4.72
43"	27"	5'-0"	1'-3"	1'-9"	1'-7"	1'-6"	12'-0"	6'-09"	6.09

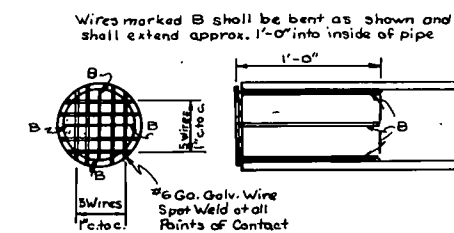
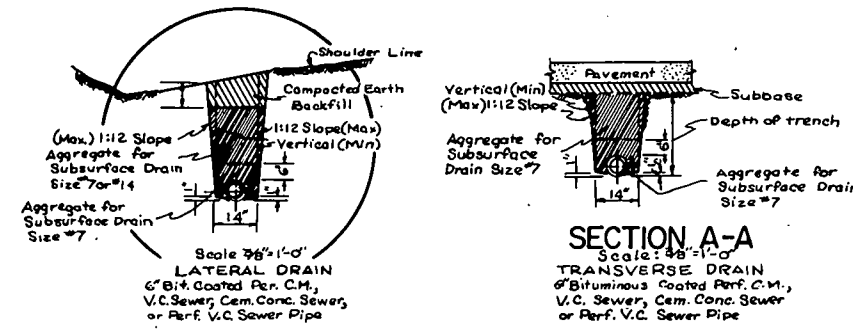
## CULVERT HEADWALLS

SOME DETAILS SHOWN ARE ADAPTED FROM STDs. OF INDIANA STATE HIGHWAY DEPT.

SYMBOL		DESCRIPTION		DATE	APPROVAL
<p>REVISIONS</p> <p>MONICAL &amp; WOLVERTON ENGINEERS-ARCHITECTS INDIANAPOLIS, INDIANA</p> <p>U.S. ARMY ENGINEER DISTRICT, LOUISVILLE CORPS OF ENGINEERS LOUISVILLE, KENTUCKY</p> <p>DRAWN BY: KAY</p> <p>TRACED BY: S.S.</p> <p>CHECKED BY: R.D.L.</p> <p>SUBMITTED: Robert D. L.</p> <p>APPROVED: [Signature] CHIEF, ENGINEERING DIVISION</p> <p>APPROVED: [Signature] COL, CORPS OF ENGINEERS, DISTRICT ENGINEER</p> <p>DATE: APRIL 1963</p> <p>SCALE: No Scale</p> <p>DRAWING NUMBER: EFW 143-12.4/23</p>					



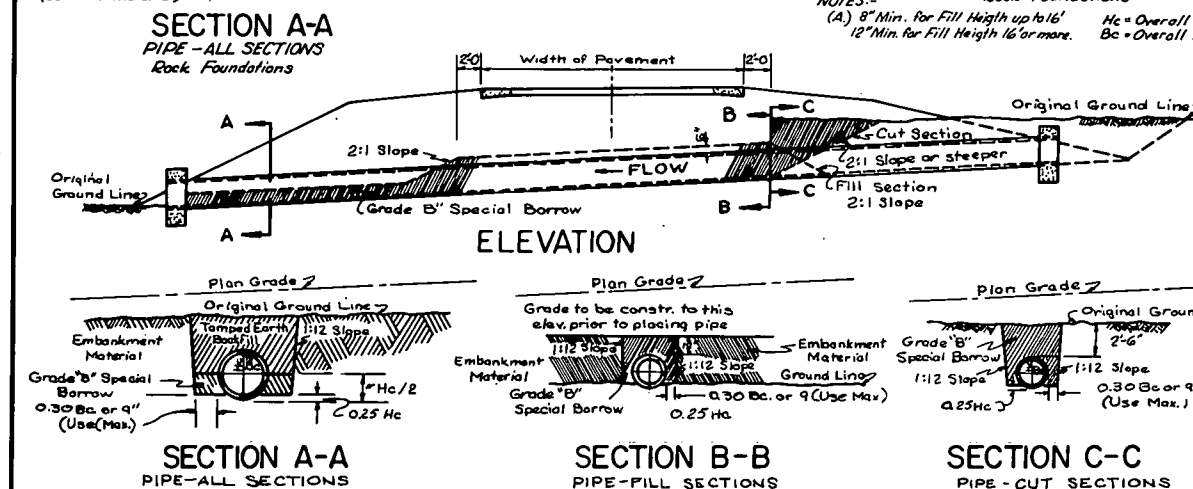
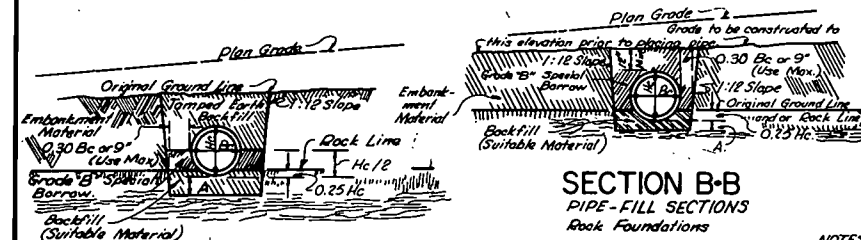
NOTE: Where perforated corrugated metal pipe with bottom perforations is used aggregate shall be placed 2" below the bottom of the pipe.  
When sectional pipe is used the last two (2) joints on the open end of the pipe shall be cemented.  
Where transverse subsurface drains have a covering (below subgrade elevation) of less than one foot (1'-0") the pipe shall be Bituminous Coated Perforated Corrugated Metal Pipe.



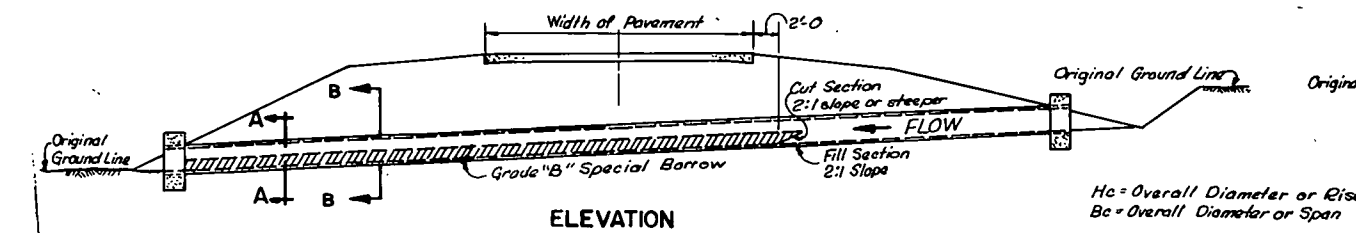
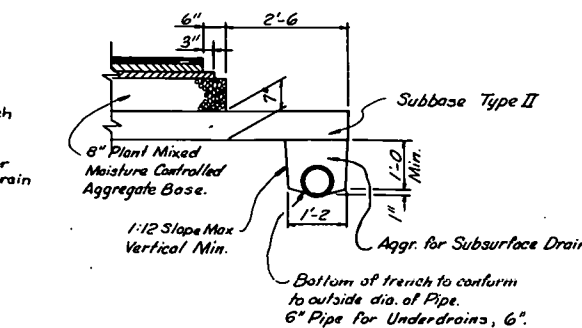
## DETAIL OF PIPE SCREEN

NOTE: This type of screen or one approved by the Contracting Officer to be used on the outlet end of Subsurface Drain.  
NOTE: Type 'A' Guide Posts to be set at the outlet of subsurface drains, of the exact location as directed by the Contracting Officer, in order to preserve the location of the Subsurface Drain.

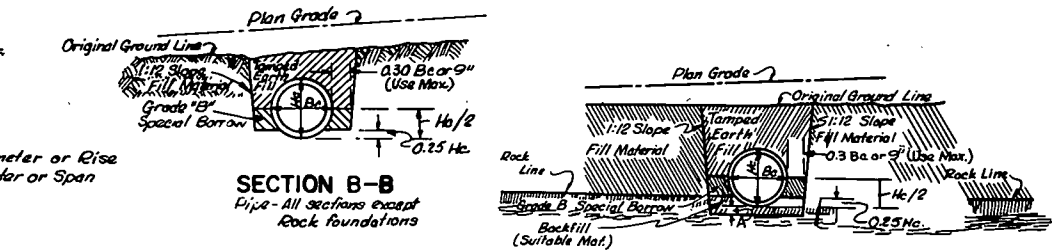
## SUBSURFACE DRAINS



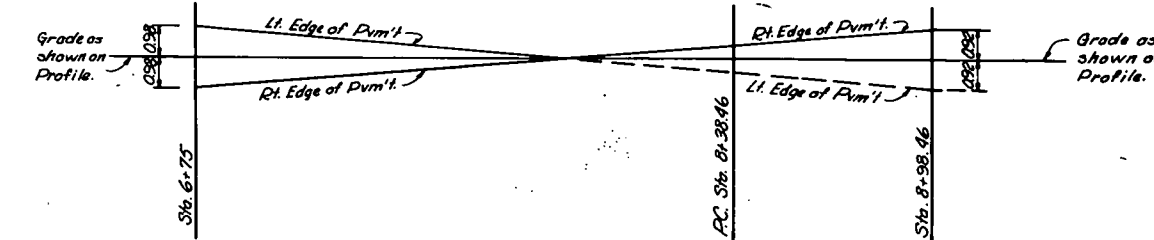
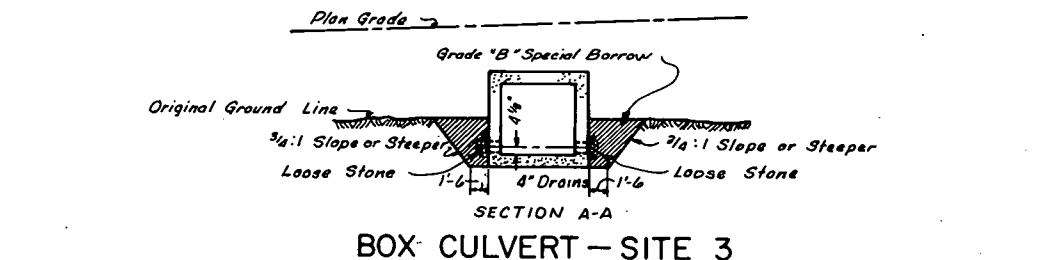
## METHOD "A"

PIPE CULVERTS  
METHOD "B"  
SITES 3 & 4

## SUBSURFACE DRAIN DETAIL - SITE 1



NOTE: Cost of drains to be included in unit price of the Structure



## SPECIAL SUPERELEVATION TRANSITION DETAIL

SITE 1 - Sta. 6+75 to Sta. 8+98.46

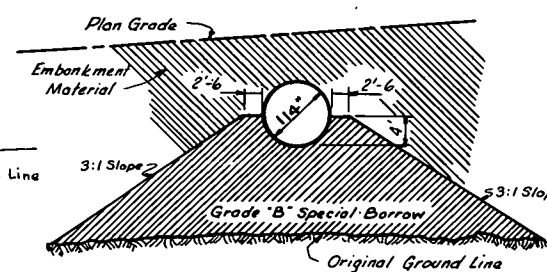
## GENERAL NOTES

## BACKFILL FOR STRUCTURES

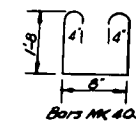
- 1 - Grade "B" Special Borrow shall consist of crushed or uncrushed gravel, crushed stone, blast furnace slag, suitable sand or other material approved by the contracting officer, but shall not contain more than 10% passing the No. 200 sieve - If more than 10%, the ratio of the fraction passing the No. 200, to the fraction retained on the No. 30, shall not exceed 0.2.
- 2 - Backfill for Pipe Culverts and Structural Plate Pipe Culverts will be included in the cost per linear foot of Structure.
- 3 - Backfill for "D.C. Box Culvert, Site 3" will be included in the lump sum price of that Structure.
- 4 - Method "A" used for Site 1.
- 5 - Method "B" used for Structures on Site 3 and Site 4.
- 6 - Method "B" used for Structures under Public Road, Commercial Drive and Private Drive Approaches.
- 7 - Earth backfill used for Structures under Field Entrances.

DETAILS SHOWN ARE ADAPTED FROM STDS OF INDIANA STATE HIGHWAY DEPT.

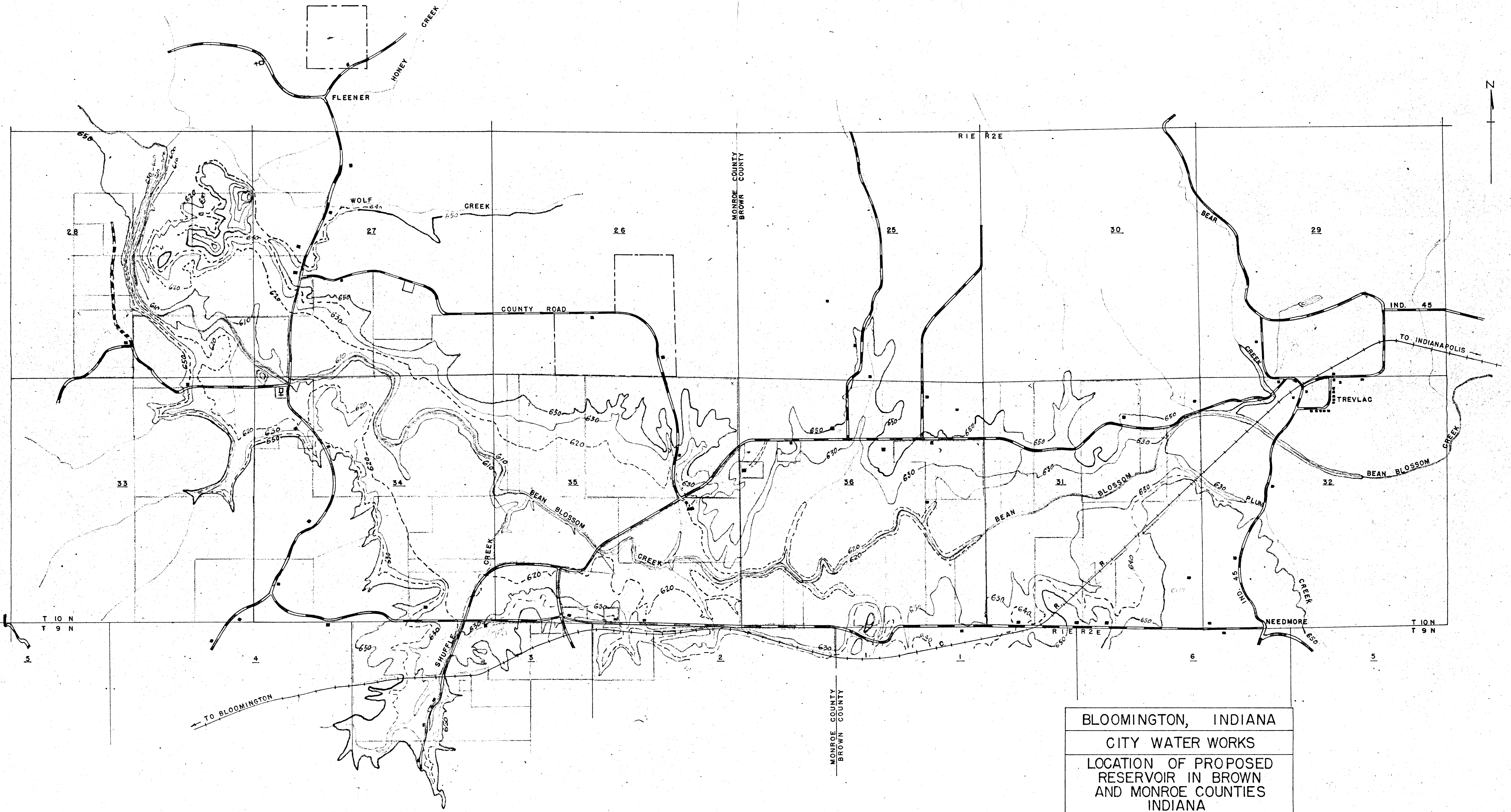
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
MONICAL & WOLVERTON ENGINEERS-ARCHITECTS INDIANAPOLIS, INDIANA		U.S. ARMY ENGINEER DISTRICT, LOUISVILLE CORPS OF ENGINEERS LOUISVILLE, KENTUCKY	
DRAWN BY: K.A.Y.		OHIO RIVER BASIN	
TRACED BY: K.A.Y.		MONROE RESERVOIR SALT CREEK, INDIANA	
CHECKED BY: RDL		MISCELLANEOUS DETAILS	
SUBMITTED: Robert O. Jones		SHEET-2	
APPROVED: R.H. Hagan		DATE: APRIL 1963	
CHIEF, ENGINEERING DIVISION		DISTRICT ENGINEER	
APPROVED FOR:		SCALE: No Scale	
DATE:		DRAWING NUMBER	
		EFW 143-12.4/24	

ELEVATION FOR STR. NO 10  
SITE 4

## SECTION FOR STR. NO 10 - SITE 4

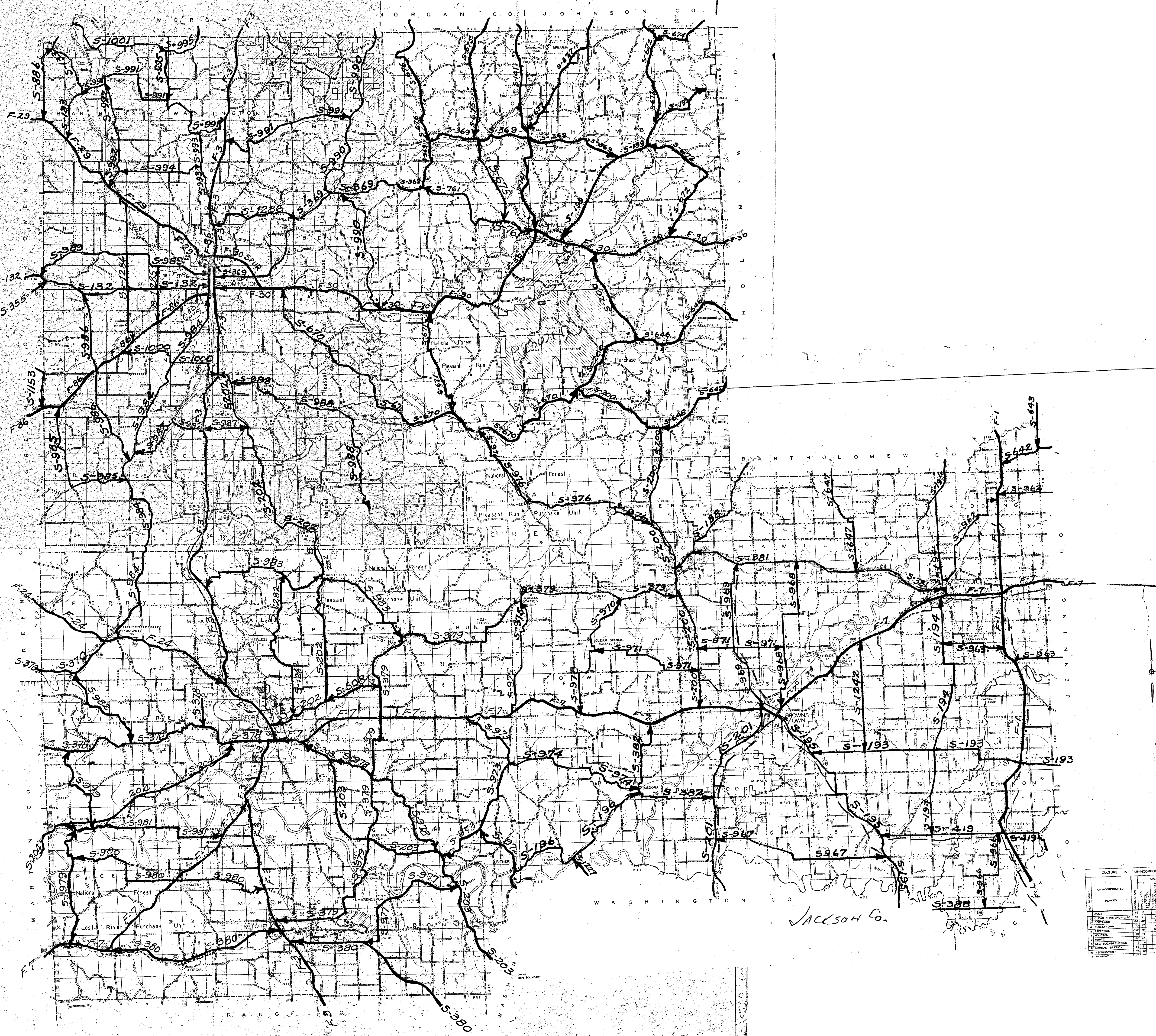
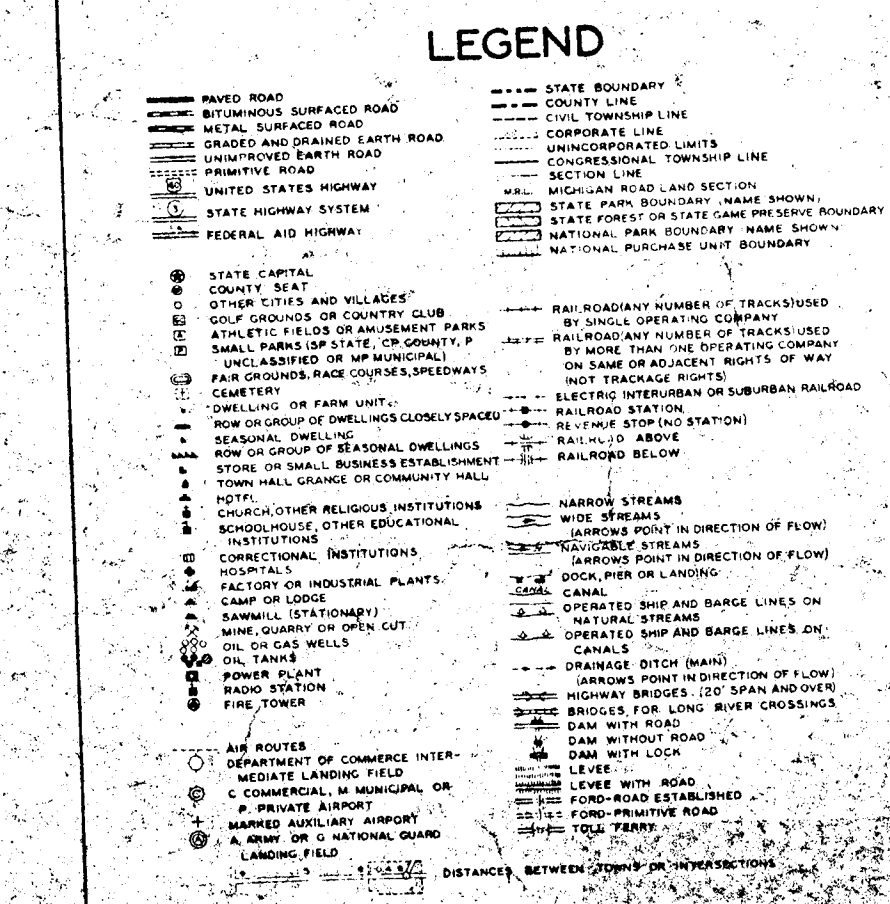


SYMBOL	DESCRIPTION	DATE	APPROVAL
<b>REVISIONS</b>			
<b>MONICAL &amp; WOLVERTON</b> ENGINEERS—ARCHITECTS INDIANAPOLIS, INDIANA		<b>U.S. ARMY ENGINEER DISTRICT, LOUISVILLE</b> CORPS OF ENGINEERS LOUISVILLE, KENTUCKY	
DRAWN BY: R.D.L.	OHIO RIVER BASIN <b>MONROE RESERVOIR</b> SALT CREEK, INDIANA  <b>BOX CULVERT</b> <b>DETAILS</b>		
TRACED BY:			
CHECKED BY: M.S.G.			
SUBMITTED:			
<i>Robert D. L...</i> ENGINEER			
APPROVED:	APPROVED:	DATE: APRIL 1954	
<i>E. B. H...</i> CHIEF, ENGINEERING DIVISION	<i>James A. L...</i> COL., CORPS OF ENGINEERS	DISTRICT ENGINEER	
APPROVED FOR:	SCALE: 1/4" = 1'-0" DRAWING NUMBER <b>EFW 143-12.4/25</b>		
DATE:			



BLOOMINGTON, INDIANA  
CITY WATER WORKS  
LOCATION OF PROPOSED  
RESERVOIR IN BROWN  
AND MONROE COUNTIES  
INDIANA

DRAWN BY RJB	DATE MAR. 11, 1950	SCALE 1" = 1000'	DRAWING NO B
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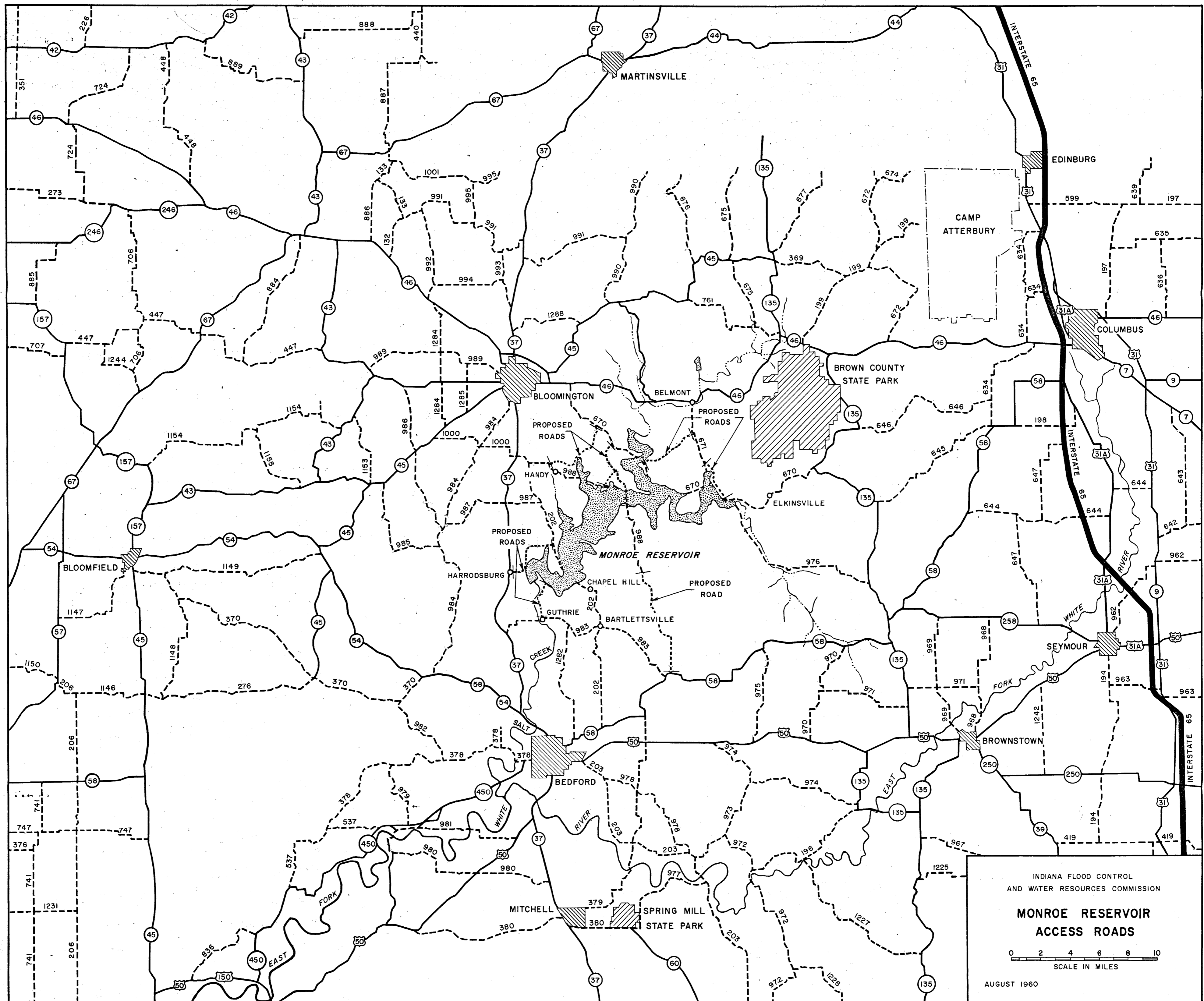
KEY NUMBER	CULTURE IN UNINCORPORATED PLACES		CULTURE NOT INCORPORATED						
	UNINCORPORATED PLACES	POPULATION	TOTAL POPULATION						
			BLACKS	WHITE	SPANISH	INDIANS	CHINESE	JAPANESE	OTHER
1	ACME	800	0	0	0	0	0	0	0
2	CLARK SPRINGS, MISS.	800	0	0	0	0	0	0	0
3	COWLAND	101	36	4	2	0	0	0	0
4	DAVIDSTOWN	100	0	0	0	0	0	0	0
5	FREE TOWN	357	6	20	3	0	0	0	0
6	HIGH TOWN	100	4	1	0	0	0	0	0
7	HOUSTON	100	0	0	0	0	0	0	0
8	MARY	15	0	0	0	0	0	0	0
9	NEW BAYVIEW	200	0	0	0	0	0	0	0
10	NORMAN STATION	85	0	0	0	0	0	0	0
11	ROBINSON	100	0	0	0	0	0	0	0
12	WETZEL	100	0	0	0	0	0	0	0

GENERAL HIGHWAY AND TRANSPORTATION MAP  
LAWRENCE COUNTY  
INDIANA

PREPARED BY THE  
STATE HIGHWAY COMMISSION OF INDIANA  
IN COOPERATION WITH THE  
U.S. DEPARTMENT OF AGRICULTURE  
BUREAU OF PUBLIC ROADS  
DATA OBTAINED FROM  
STATE-WIDE HIGHWAY PLANNING SURVEY

## SYSTEM MAP

F=FEDERAL AID PRIMARY  
S=FEDERAL AID SECONDARY  
U=FEDERAL AID URBAN  
DATED 7-27-5



INDIANA FLOOD CONTROL  
AND WATER RESOURCES COMMISSION

**MONROE RESERVOIR  
ACCESS ROADS**

0 2 4 6 8 10  
SCALE IN MILES

AUGUST 1960

